WESTERN GAS

February 1932

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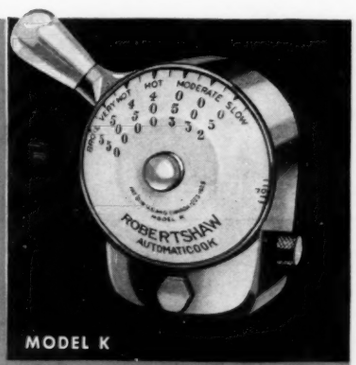

MODEL K

The major essential for correct OVEN PERFORMANCE

MODEL F

"AutomatiCook"

GAS COOKING has become a precise art in the relatively few years that gas ranges have been equipped with Robertshaw automatic oven control.

Listen to the talk in your own appliance department, and you will find that the major consideration with a woman when she looks at a range is the oven control.

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And that shows you what a tremendous influence Robertshaw advertising has exerted . . . how it has made women dissatisfied with their old ranges . . . how it has shown them that a gas range, properly equipped, is the finest cooking unit in the world.

You can make your appliance department much more interesting . . . and more productive . . . by a closer "tie-in" with the Robertshaw campaign. Let us tell you all about it!

Robertshaw Thermostat Co.
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A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

THE PERFECT APPLICATION OF A PRINCIPLE

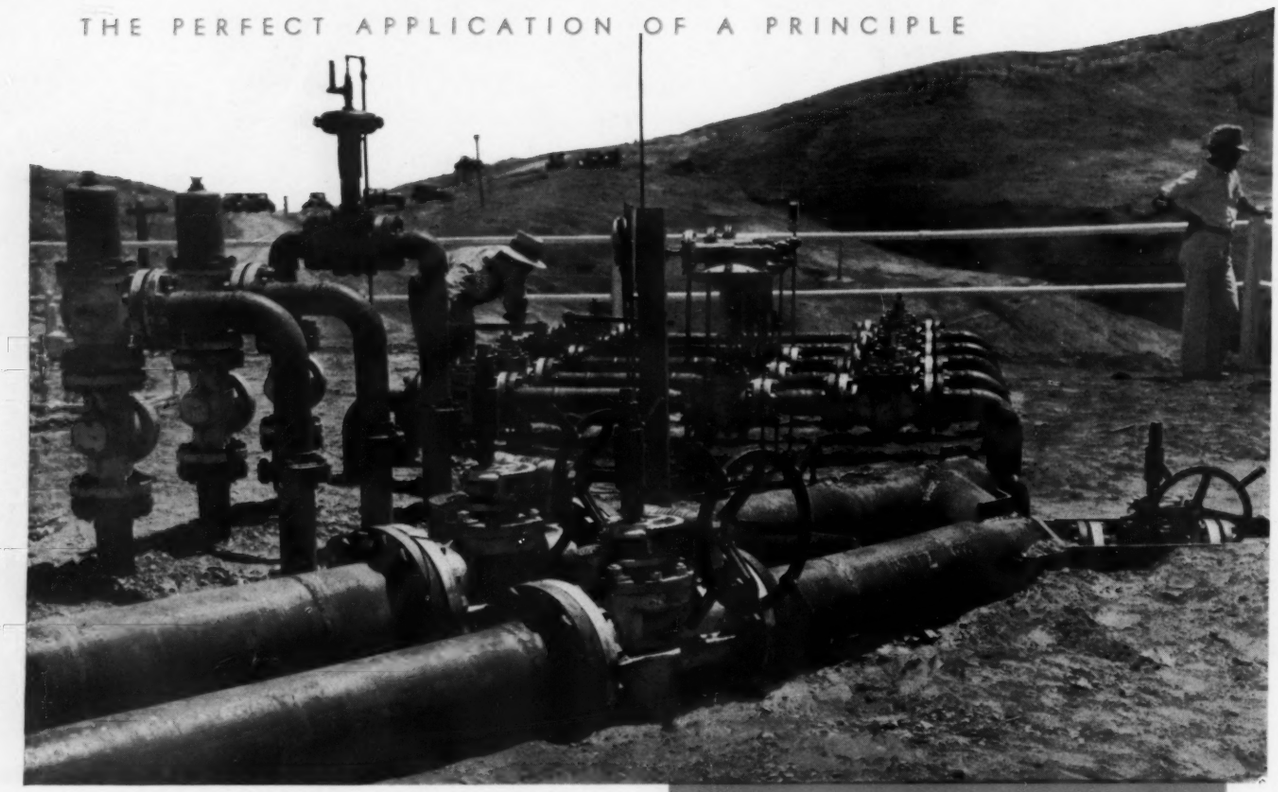

ILLUSTRATION shows regulators from gas traps in a Kettleman Hills plant equipped with Nordstrom "Venturi" Valves. This assures perfect valve control. The patented "Sealdport" principle of lubrication prevents gas leaking internally or externally. Ask for new catalog No. 8.

MAKING REGULATOR LINES SAFE AGAINST LEAKING

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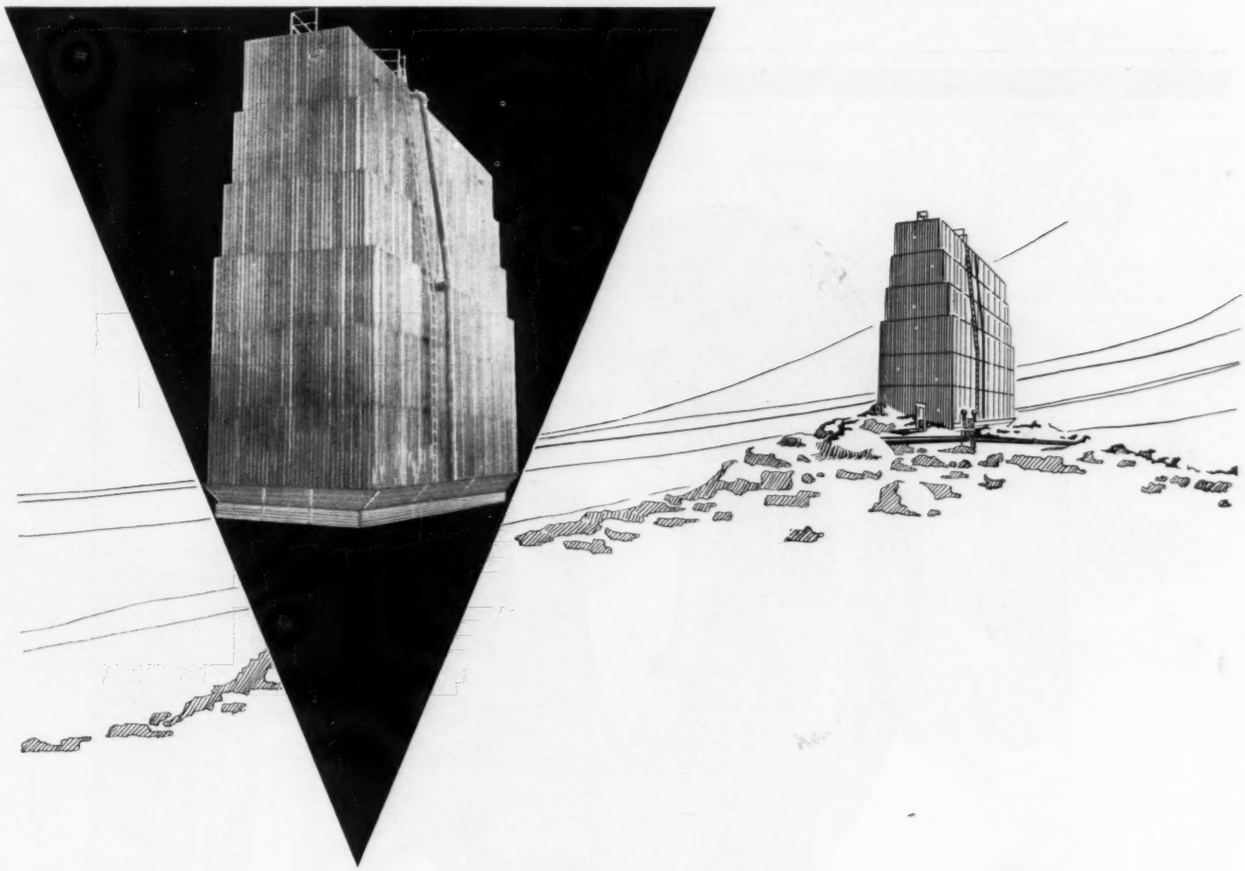
MERCO

Merco Swivel Flanges

A worthy companion of Nordstrom Valves is the new "Merco" Swivel Flange for welded pipe offering many advantages. Ask for details.



This Tower Defeats the Lusty Winds of Kettleman Hills

The new type Fluor Cooling Tower pictured above stands upon the peak of one of the highest hills in the Kettleman field. Strong winds prevail constantly in this district. But this Fluor tower with its aerator panels (a new Fluor development) in place of louvers, conserves water to a far greater degree than any other tower ever in operation in Kettleman.

The present aerator type Fluor Tower by its unique, highly efficient design, positively insures a minimum water loss and maintains a much superior cooling performance—under the most severe operating conditions. The new Fluor aerators are also readily adaptable to any existing towers where windage losses are high.

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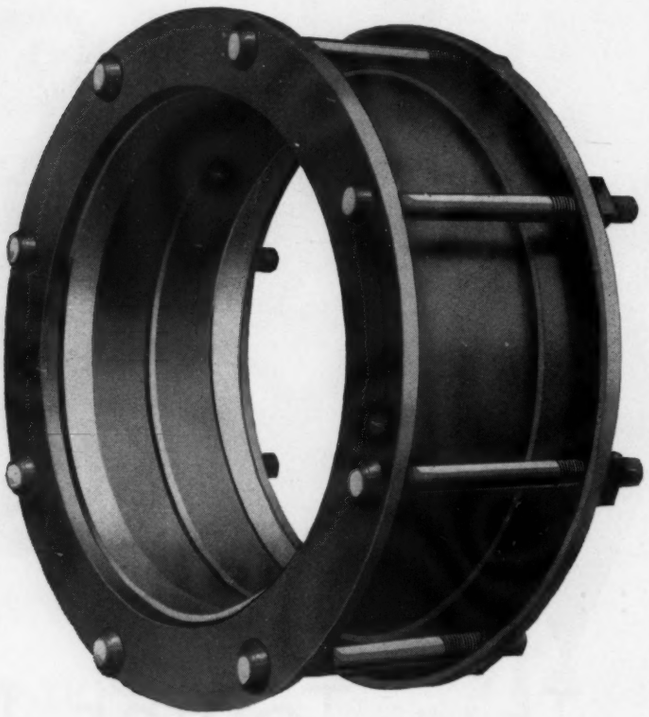
February, 1932, Volume VIII, Number 2, Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered at second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.



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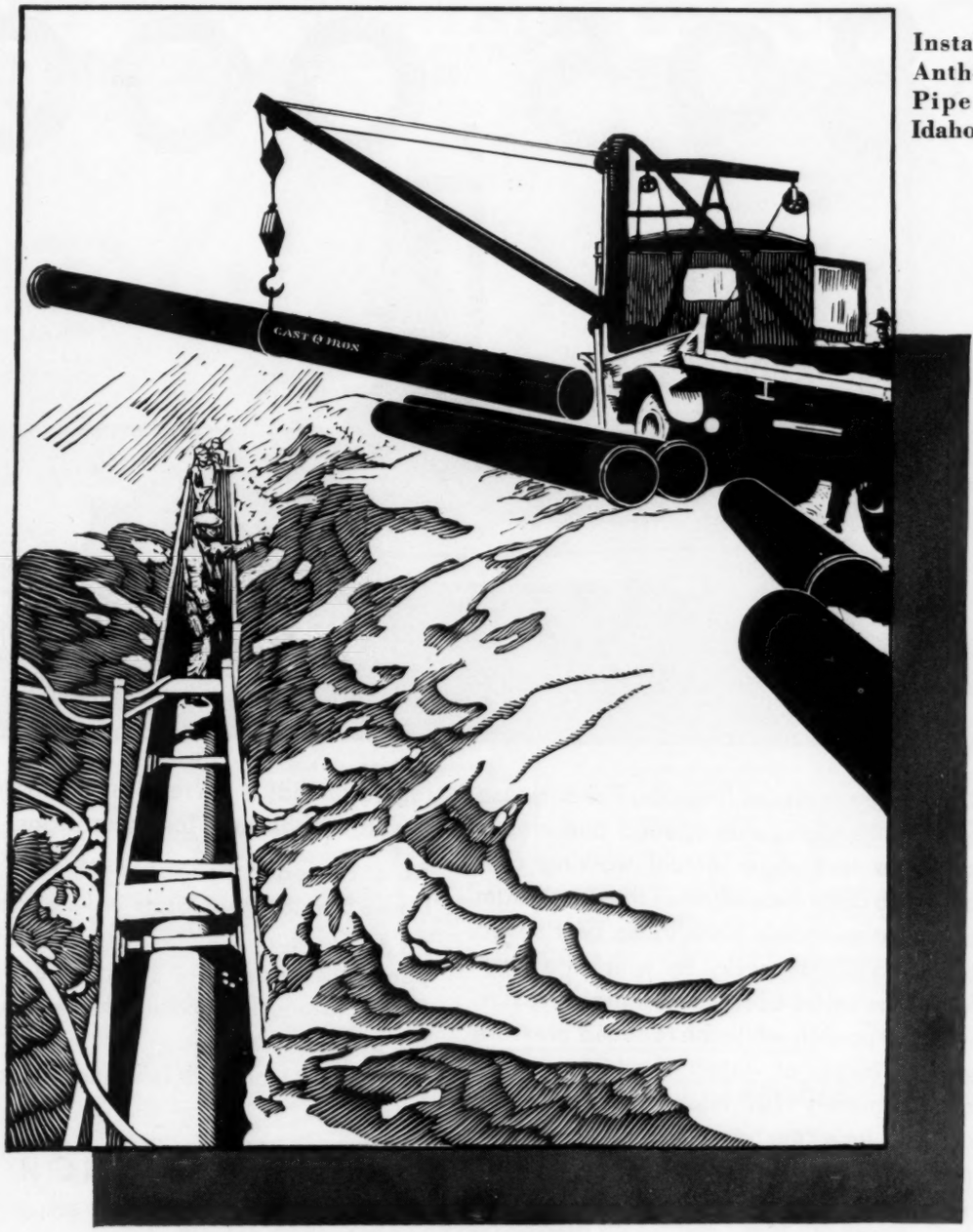

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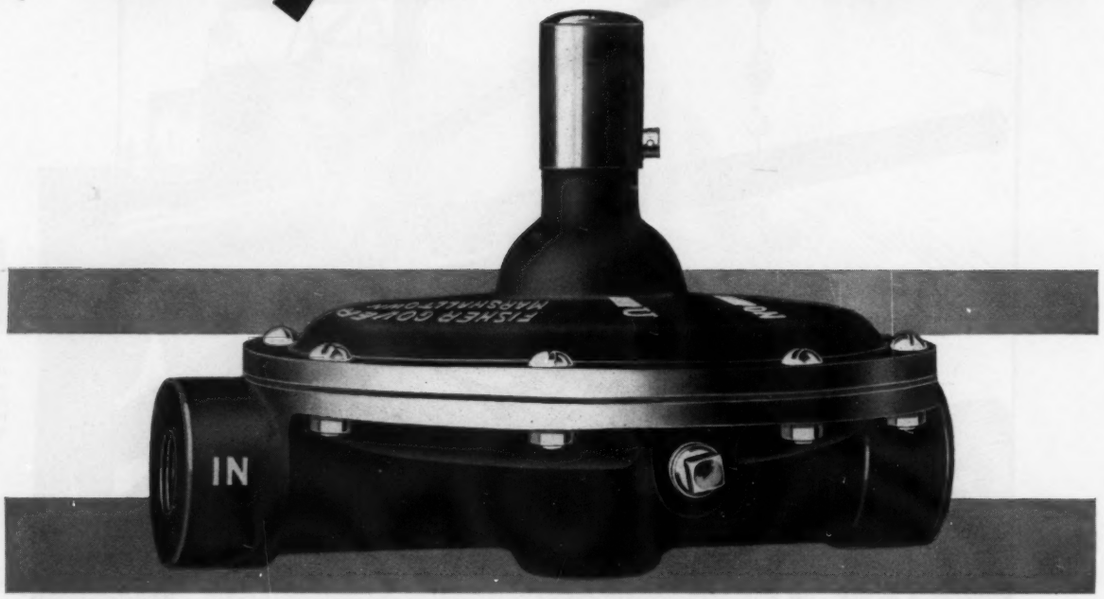

That is the number of times this Fisher House Service Regulator was opened and closed during a test under actual working conditions to determine whether the diaphragm and seat materials were those best suited to the particular service for which the regulator was to be used. The initial pressure was 150 pounds while the reduced pressure was 10 inches of water. The test required approximately 1100 hours, and at the end of that time the regulator was working perfectly and showed no signs of wear.

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As a consequence, Fisher "Custom Built" House Service Regulators have established an enviable reputation for close and dependable regulation, trouble-free operation and long life. Facilities are adequate for prompt shipment.

Bulletin G-31 gives details and capacities.

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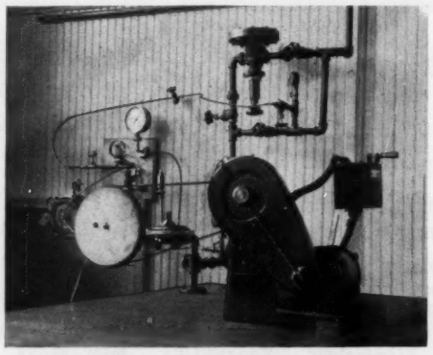

Photograph of the equipment used for making this test in the Fisher Experimental Laboratory

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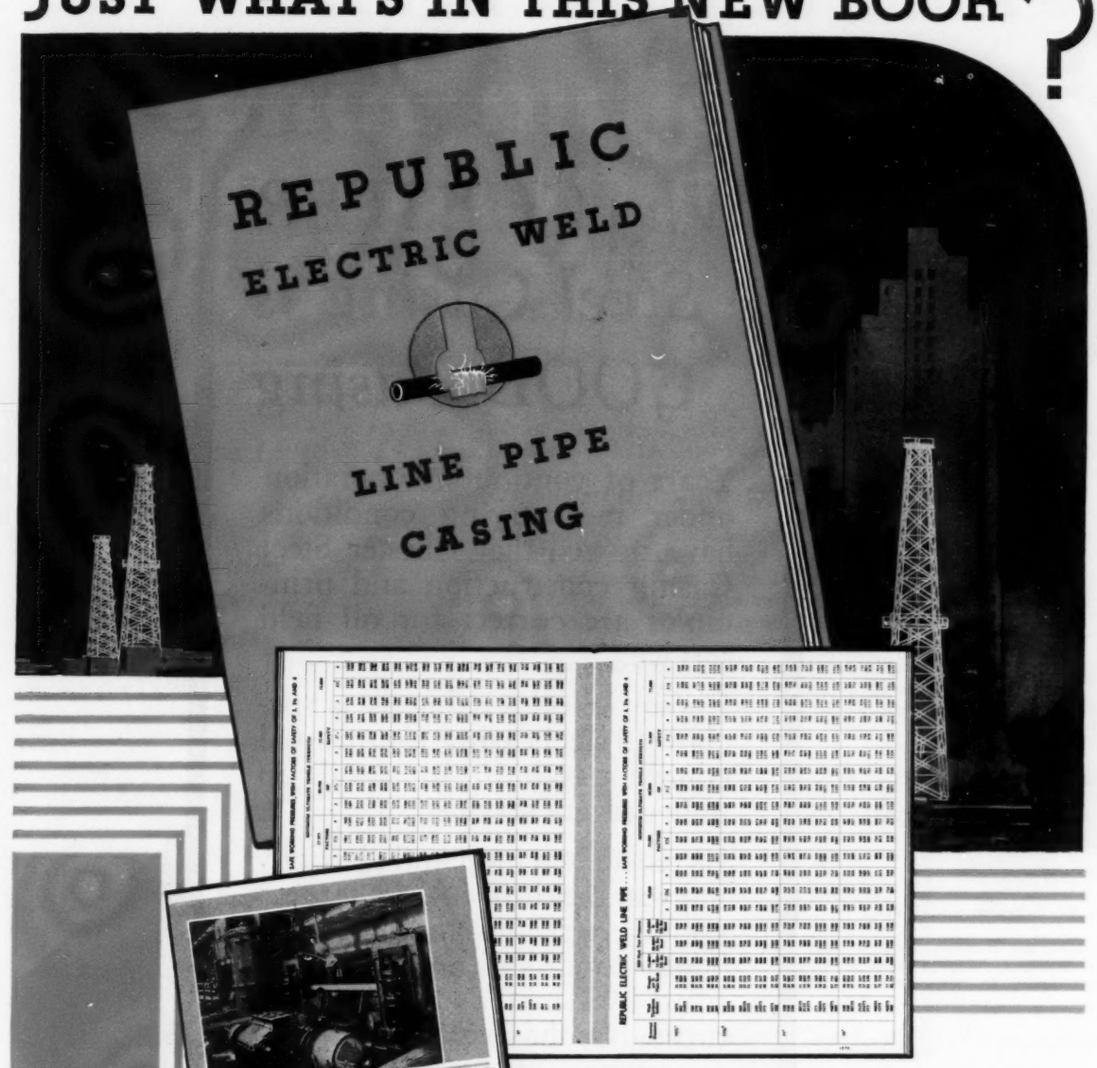

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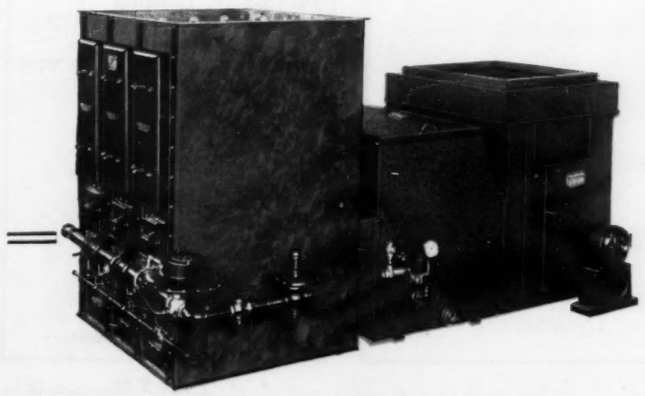
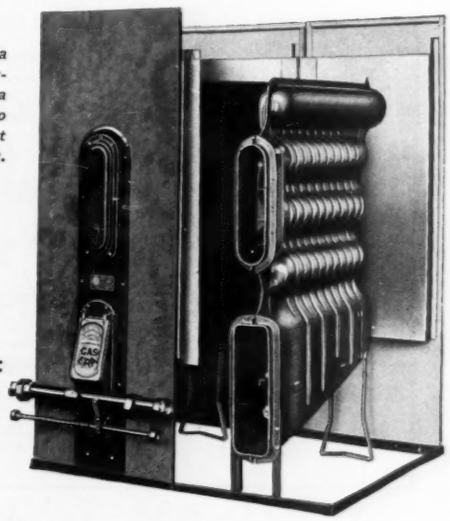
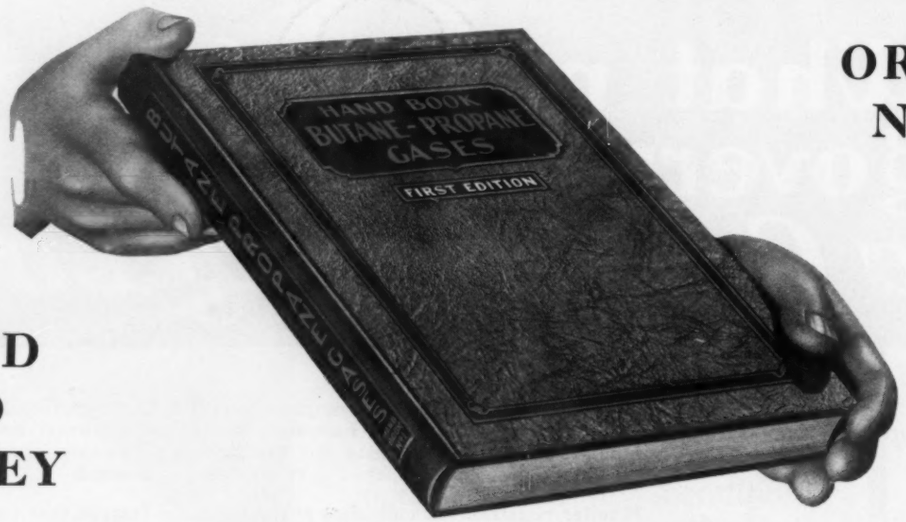


Mueller Gas Era pressed steel furnace. Gas Era Furnaces are also made with cast iron heating unit.





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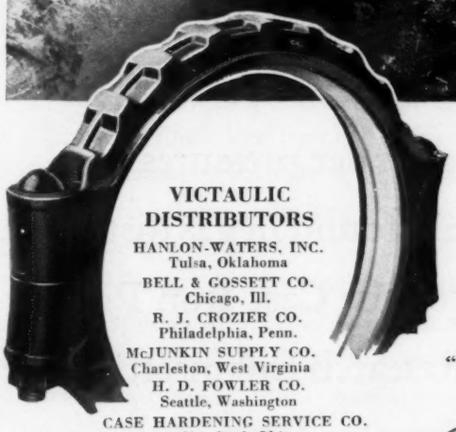

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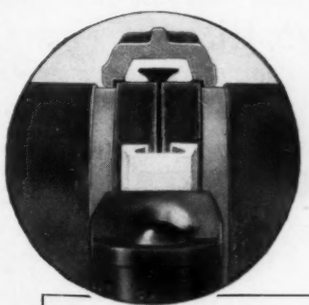

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Study Lindewelding Technique in this Motion Picture

Our motion picture, "The Lindeweld Process for Pipe Line Construction," shows every detail of Lindewelding technique, which differs from neutral flame welding technique in that it employs a special rod, a special flame adjustment, and the "backhand" method of blowpipe manipulation. It reveals the actual steps in making a Lindewelded joint. Pipe line officials and welding or engineering societies may borrow this picture free of charge by writing to any Linde District Office. It is furnished in 16 mm. and 35 mm. safety film.

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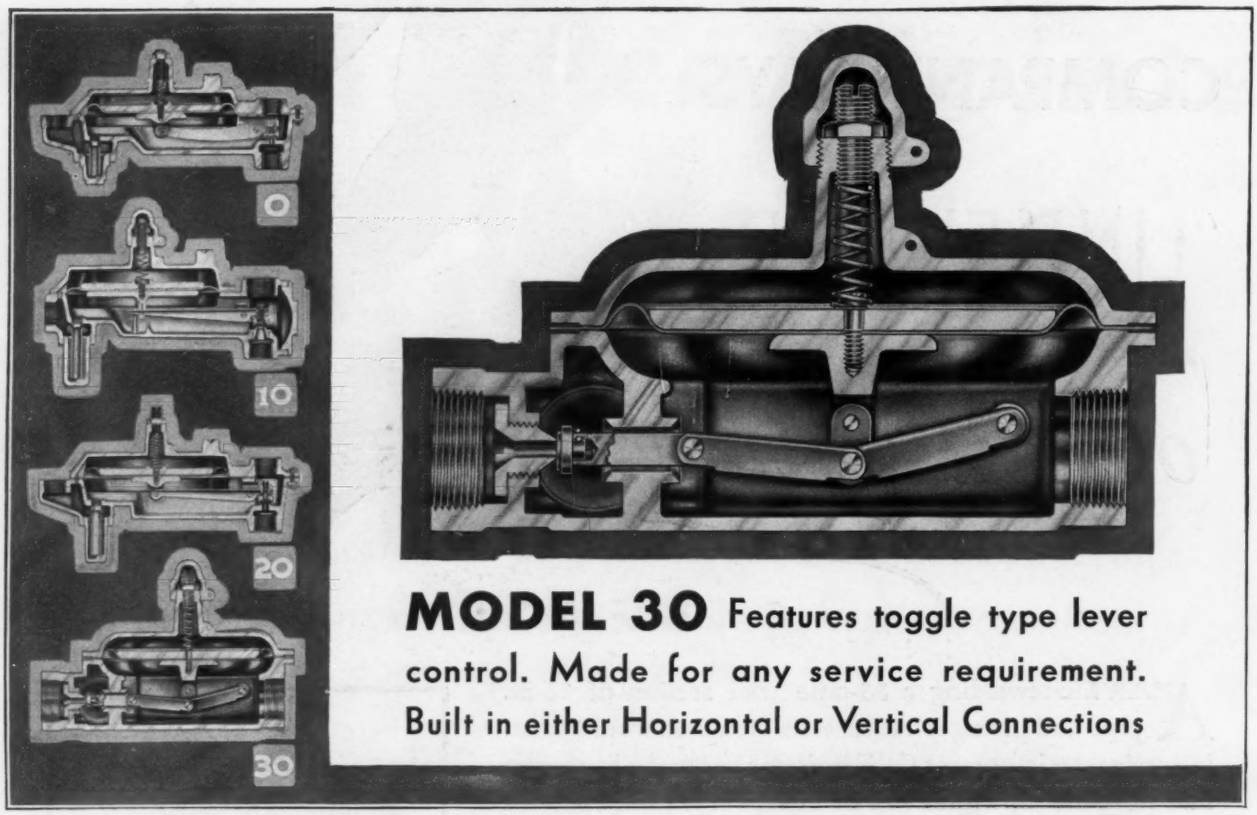

MODEL 30 Features toggle type lever control. Made for any service requirement. Built in either Horizontal or Vertical Connections

● **MODEL 20—The design of this Regulator is primarily the same as that of Model 10. However, Model 20 features all parts so accessible as to permit interchangeability in the shop. The material used in the construction of this Regulator, as in all Reynolds Units, is of A-1 quality.**

● **MODEL 10—All parts are interchangeable and so accessible that it is not necessary to remove regulator from pipe line.**

● **MODEL 0—With or without Mercury Seal. The old standard; has served successfully for more than a quarter-century.**

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Why not make sure that when you pay for a thousand cubic feet of gas that you get a thousand feet and not nine hundred.

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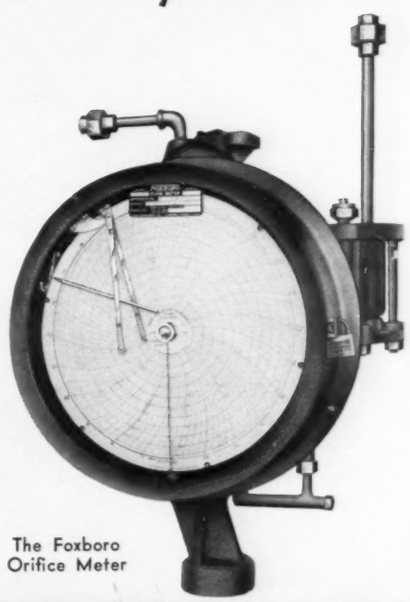

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Instruments for Controlling, Recording, and Indicating Temperature, Flow, Level, and Pressure

When the sculptor drops his mallet and chisel

AND Now It's Completed! The designing, manufacturing and testing have all been completed. The tools have been dropped. We know the whole job has been well done, and authorities agree.

The completed product stands out in testimony to the excellence of TRANSIT design, standards, workmanship, and most important to TRANSIT traditions—that driving force which to us means The Spirit of the Pioneer. This was implanted early in this Company and kept alive by continued success in meeting every noteworthy advance in the oil and gas industry with just the right pumping and compressing equipment.

To-day TRANSIT runs true to form,

The 1200 H.P. gas engine gas compressor illustrated below is probably the greatest contribution to the economical transportation of natural gas over long distances.

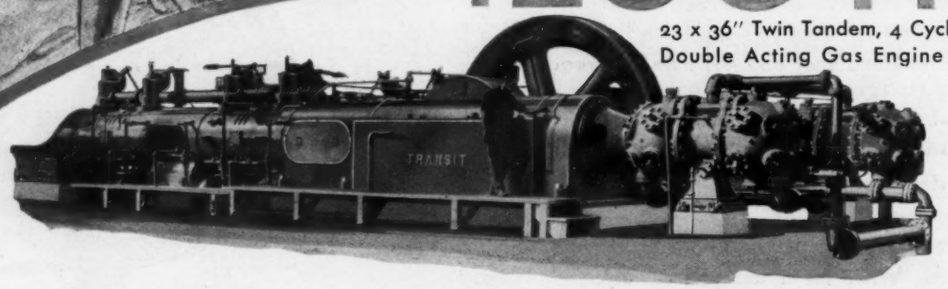
The unit is great because it is simple. Nothing new of a revolutionary character—just the sum of TRANSIT'S keen, experienced engineering talent working with their feet on the ground.

Some of the foremost gas engineers and executives have been here. All are agreed that this unit marks an unusual advance in gas compressor design and construction.

To the engineers in this country interested in this size of compressing unit, we extend a most cordial invitation to visit our Works and see this engine in operation under actual operating conditions of compressing natural gas.

1200 H.P. TRANSIT

23 x 36" Twin Tandem, 4 Cycle, 125 R.P.M.,
Double Acting Gas Engine Compressor



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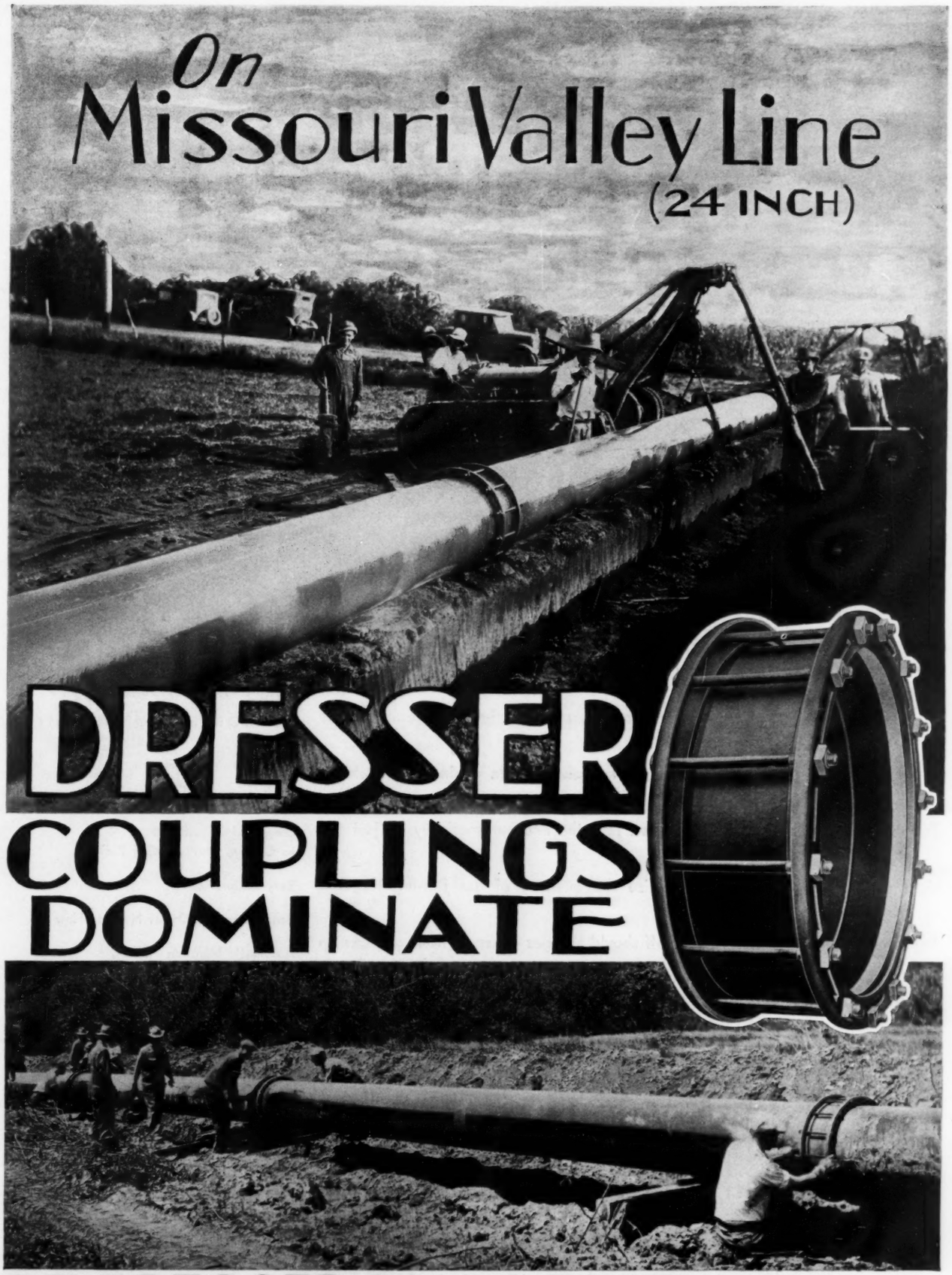

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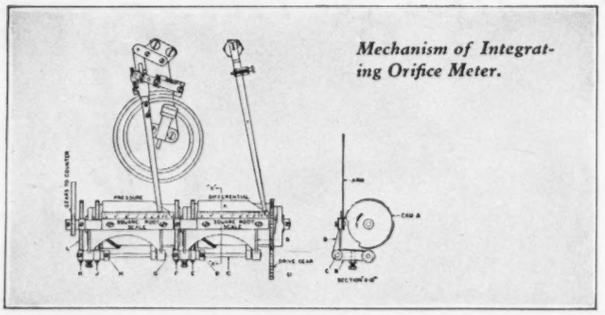

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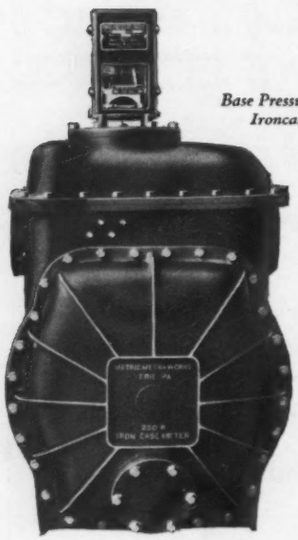

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THE PACIFIC COAST GAS ASSOCIATION

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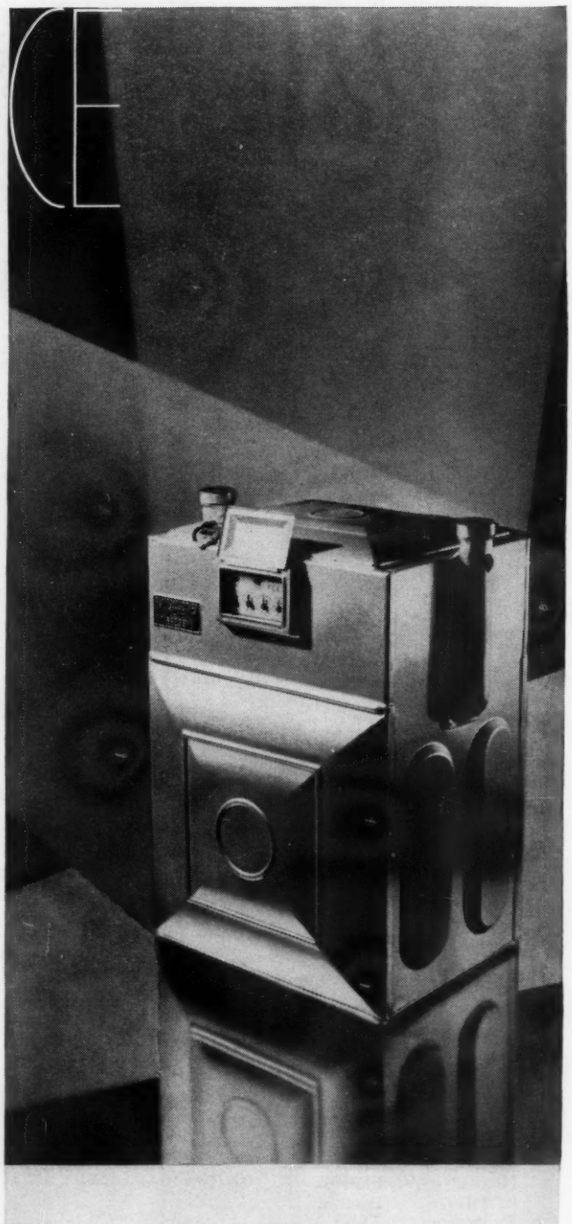

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(Also see Advertisement opposite Table of Contents)

February, 1932

WESTERN GAS

Vol. VIII, No. 2

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Review of the Month

A SOMEWHAT general demand for a reduction in utility rates recently prompted L. B. Denning, president of the Lone Star Gas Co., to issue a statement on fundamental economics of the gas situation. Agitation for lower natural gas rates, which has been particularly evident in the Southwest during this depression period, has been predicated on three main assumptions—that the gas business has not been affected by the general depression; that since other commodity prices have come down, gas prices should be reduced; that production and transmission costs have declined in line with other commodities.

Mr. Denning goes on to prove these assumptions erroneous, pointing out that gas sales have slumped in both domestic and industrial uses. Major costs encountered in producing gas service are relatively unaffected by decline in other commodity levels; for example, cost of gas at the well is established on the basis of long term contracts. Wages, bearing a basic relation to rate scale, would necessarily drop with rate reduction—and many considerations urge against drastic wage cuts. Money, too, has not only increased in cost but is harder to get at present than it has been for several years past. Pipe and other materials entering into gas service have declined only 5½ per cent from their 1926 peak. Most significant is the item of taxes, which in some instances has increased as much as 400 per cent. On the Lone Star system taxes came to 54 cents a month for each customer served, equal to 29 per cent of the company's net earnings.

While the general trend of gas rates has been downward, this course has been made possible only by steady increases in sales. With gas operating costs fluctuating but little, and with sales curves on the decline, rate reductions would seem uncalled for on most gas systems at this time.

Butane-Propane Progress Reports

Drafting a national code of practices for marketing liquefied petroleum gases is the important task which now engages the National Bottled Gas Association. Members of the industry are urged to assist the executive board with suggestions, in order that the Code may express to the fullest extent the standards which should govern in ethical merchandising and competition. Proposed Code regulations will be submitted to the membership at a meeting in April.

Adoption of the constitution and by-laws gave permanent form to the National Bottled Gas Association at its New York session.

Central plant distribution of liquefied petroleum gases already has major progress to report in 1932. Plant construction programs are announced in Idaho, Utah, the Province of Quebec, Indiana, Illinois and several east coast points. On the west coast butane service has newly begun at The Dalles, Ore., and El Centro, Calif.

A Tussle for the Cooking Load

Gas sales work must be geared to meet tighter competition in the domestic cooking field. All forces within the electrical industry have joined hands in a three-year program which is designed to add a million ranges to power company lines, doubling the present number of electric range users. A 12-million dollar advertising war chest will supplement the combined efforts of manufacturers, central stations, wholesalers, dealers and contractors.

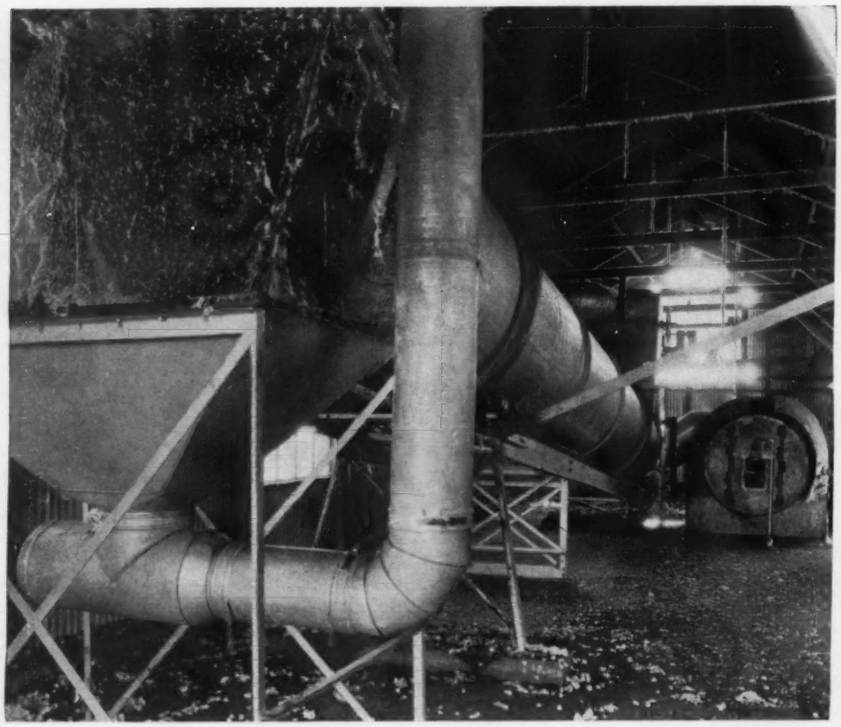
There was a time when electrical sales practice was distinctly superior to gas merchandising. That day has passed, and intensified sales work put behind the modern gas range will not only hold this basic load but develop it to new high levels.

More Attention Due from Congress

How the utilities of the nation will fare at the hands of Congress is giving usual concern at this season. So long as there are commissions and committees, one investigation will probably follow closely upon the heels of another. On January 19 the House of Representatives authorized an investigation into public utility holding companies by its Committee on Interstate and Foreign Commerce. Railroads were excluded from the inquiry.

Need for national budget balancing has taken the House of Representatives Ways and Means Committee far afield in their search for new sources of revenue. Serious thought is being given, say news reports of late January, to taxing domestic gas and electricity. Legislators will do well in this connection to recognize the competitive aspects of utility service. Utilities are monopolies in name only, their services selling in open market against those of rival industries, such as oil. Sales taxes of the type under consideration are necessarily discriminatory, to say nothing of the already excessive tax load now borne by utilities.

Automatic Serves



Furnace and drying tube, showing the dryer as set up in the Corcoran, Calif., plant of J. G. Boswell & Co. The exterior of the furnace is shown, with hole for inserting the gas burner. Over 2,300 bales of high grade cotton and more than 700 bales of bollie cotton were put through this dryer during the 1930 season.

CALIFORNIA today, while not one of the large cotton producing states, is producing a higher quality and a greater yield of cotton per acre than any other state. As might be expected, natural gas has found a way to serve this growing industry, and later in this article the writer will describe its part in preparing cotton for market.

Kings County, in the San Joaquin Valley, though not the largest cotton growing county in California, is probably the best known. The excellent quality of the product and the large yield per acre there has given the location a splendid reputation.

Cotton growing was started in Kings County on a commercial scale in 1923, with the planting of 600 acres. Since that time there has been a steady increase in acreage, and in 1930, 24,000 acres were planted and harvested. The average production per acre for the seven seasons was over 500 pounds per acre, a very remarkable production record, since the average production per acre for the United States is 184 pounds, and the average production per acre for California is 324 pounds. In 1929 and 1930 the production per acre in Kings County was greater than in any other county in the state, which also means in the nation.

This industry in California has centered in Corcoran where there are three companies operating 10 gins and two oil mills, handling this year approximately 30,000 bales of cotton. The high production of cotton in this county has been due to the uniform quality of the land in the Corcoran area, much of which is on the edge of the old Tulare lake bed. Good land, intelligent farming, and plenty of irrigation, have been the causes of good yields. Two bales per acre are not unusual, and one 60-acre piece in 1930 produced approximately three bales per acre. The value of the cotton crop in Kings County for 1929 was $2,310,000, a healthy growth from nothing in 1922.

It may be of interest to some to follow the handling of cotton through the gins where it is prepared for the mills. In a modern gin the cotton is not handled by hand from the time it is loaded in the field, until it is baled and delivered to the storage yard. It is delivered from one department to another through large pipes, by means of large Multivane suction fans and blowers. The cotton is hauled to the gin in wagons, weighed and, if wet, delivered to the dryer. If it is dry, it is delivered direct to the boll extracting machine. The cotton is drawn from the wagon by suction through 16-inch suction pipes, delivered to the dryer where all moisture and dust is removed and then sent to the boll extracting machine where the bolls are completely removed. From there it goes to the gins where the seeds are removed and the cotton baled. The cotton is then stored in the yards awaiting delivery to the mills. The seed goes to the seed house, where next year's planting is separated and the rest made into oil.

One may wonder where natural gas enters this picture. The first application of natural gas was to fire the high-pressure boilers supplying steam to the oil mill and refinery. But in the fall of 1930 a new use for natural gas as a fuel was developed in the cotton industry by Sherwood Green, inventor of the Green automatic cotton dryer. An installation of this machine at the J. G. Boswell & Co. gin at Corcoran, Calif., using gas from the lines of the Southern California Gas Co., operated successfully during the 1930 season, drying from 60 to 100 bales of cotton per day. This season, they added a second dryer to their equipment, thereby doubling the drying capacity of the plant.

C. M. Eyman

Wet cotton has been one of the most serious problems of the industry since the invention of the cotton gin in 1791, by Eli Whitney. A large proportion of the cotton crop throughout the United States must be harvested during the rainy season. In California there is the added difficulty resulting from heavy land fogs which are characteristic of the winter season. Cotton once wet in the fields, whether from heavy dew, rain or fog, does not dry readily and is frequently delivered to the gin so wet that it clogs the gin saws, causing the breakage of machinery with resultant trouble and delay. Cotton buyers and graders list the following faults with cotton ginned while wet:

(1) It is gin cut, that is, the length of the staple is broken.

Dryer Fired *by* Natural Gas *the* Modern Cotton Gin

By C. M. EYMAN

Manager San Joaquin Division
Southern California Gas Company

(2) It is rough in character; snarled and twisted so that it is difficult to spin.

(3) It is filled with small particles of leaf trash that cannot be removed in the ginning process and that stain the cotton in the bale.

All cotton is subjected to cleaning processes after picking and before ginning. The cleaning machinery is a part of every standard cotton gin. The leaf matter and dirt can be removed by the cleaning machinery when the cotton is dry, but when wet, the cotton is snarled and roped by the cleaning machinery and the dirt sticks to the cotton fibre. Drying removes a large amount of the dirt in the cotton, fluffs up the fibre and greatly improves the color of the product.

The use of a dryer not only improves the product and makes ginning much easier, but in handling bolls there results a considerable saving of cotton fibre which would ordinarily stick to the bolls and be wasted.

It is estimated that one-third of our annual cotton crop of approximately 15 million bales should be dried in a normal year. As a result of drying the grade of cotton is raised from one to three grades, an increase in value of from $5 to $20 a bale.

The Green patent involves two new principles. First the conveying of the cotton against gravity separates the dry from the wet cotton, and second, the angles of the interior vanes of the tube which separate the cotton into locks hasten the drying and assure good character of fibre.

The discharge end of the dryer tube is higher than the intake. The dryer tube contains a series of parallel vanes or shelves running the length of the tube and bent to angles that give a uniform distribution of the cotton throughout the revolving tube, separating the mass of cotton into distinct flakes giving the effect of a snow storm. Through the adjustable feature the shape of the tube can be changed to accommodate the type of material passed through the dryer whether lint cotton, snap, or bolls, even though these are wetter than usual. The warm air stream carrying the cotton forward against gravity drives out the dry cotton immediately while the wet cotton remains in the tube until its moisture content has been reduced to the desired point, assuring a uniform product.

Natural gas is an ideal fuel for this purpose because of its cleanliness and the ease of obtaining complete combustion. The natural gas burning furnace consists of an inner and outer shell. The inner shell is 4 feet in diameter and 12 feet long, is closed at the burner end and is entirely open at the other end. It is lined with fire brick and has a baffle wall 50 inches from the burner end. The outer shell of sheet iron merely serves to confine air around the inner shell and has doors at the burner end to regulate the amount of air to be admitted. The air and the products of combustion are drawn from the furnace by a No. 6½ Multivane fan and this mixture is blown through the drying tube continuously at a temperature of from 250° to 350°.

Sherwood Green, the inventor, states that careful tests have convinced him that the product of combustion of natural gas in no way injured the cotton fibre. Mr. Green states, "There is a very noticeable bleaching which accompanies the drying process which I believe to be aided by the products of the combustion of the gas. The use of gas as a source of heat makes a simpler and cheaper installation at the beginning, requires less supervision and is cheaper in operation."

The direct use of the products of combustion mixed with air to obtain proper temperature gives the highest efficiency obtainable from any heat device.

An accompanying illustration shows the furnace and the drying tube, pictur-

(Continued on Page 49)

Cotton gin and oil mill of J. G. Boswell & Co., Corcoran, Calif., where 60 to 100 bales of cotton were dried per day during the 1930 season. This season a second dryer has been added, doubling the capacity of the plant.

Method of Computing the Heating Requirements of a House, Showing Effect of Insulation, Weather-Stripping, Caulking and Automatic Control

	Sq. Ft.		Heat transmitted per sq. ft. 70° Inside 0° Outside		Heat Transfer Per Hr.
Area of windows—not weather-stripped	250	×	77.0	=	19,250
Area of doors—half glass, not weather-stripped	120	×	52.5	=	6,300
Area of walls—9-in. brick, plastered, no insulation	1,000	×	24.92	=	24,920
Area of ceilings—no attic flooring, attic unfinished, no insulation	1,000	×	19.04	=	19,040
Area of walls—9-in. concrete, no insulation, no plaster	600	×	35.84	=	21,504
Volume of house	10,000 c.f.	×	1.26	=	12,600
TOTAL	Heat units per hour				103,614
Radiation required—hot water					691 sq. ft.

Heating Requirements for Same House After Installing Insulation, Weather-Stripping, Caulking and Automatic Heat Control

	Sq. Ft.		Heat transmitted per sq. ft. 70° Inside 0° Outside		Heat Transfer Per Hr.
Area of windows—weather-stripped	250	×	77.0	=	19,250
Area of doors—weather-stripped	120	×	52.5	=	6,300
Area of walls—9-in. brick, plastered, fully insulated	1,000	×	7.35	=	7,350
Area of ceilings—no attic flooring, attic unfinished, fully insulated	1,000	×	6.16	=	6,160
Area of walls—9-in. concrete, fully insulated	600	×	7.77	=	4,662
*Volume of House	10,000 c.f.	×	0.63	=	6,300
TOTAL	Heat units per hour				50,022
Radiation required—hot water					333 sq. ft.

*Effect of weather-stripping and caulking appears in this item.

Reducing Heat Losses

By WALTER G. HEINZLE

Estimating Engineer
St. Louis County Gas Company
Webster Groves, Missouri

INSULATION, weather-stripping, automatic control, and other aids to the economical use of fuel, are bringing the comforts of gas heating to a rapidly broadening market. In this article from the January, 1932, issue of Union Electric Magazine, employee publication of Union Electric Light and Power Co. and St. Louis County Gas Co., of Missouri, Mr. Heinzle deals with the computation of heating requirements and the economies possible through improved construction.—*Editor.*

WHEN gas fuel was first introduced for heating residences many make-shift devices were used to compute the number and size of the radiators required and the size of the furnace. These methods were developed by various individuals from their heating practice. The construction of the walls, windows, roofs, etc., did not enter into the calculations.

Gas lends itself to extremely accurate measurement and control. Due to this fact several large gas companies began to make tests to ascertain the fuel requirements in several typical residences. So many new factors began to develop that the investigation was turned over to the universities with research facilities and an entirely new method of computation was developed.

Competition in the building trade and the introduction of new types of building construction started a comprehensive investigation into the losses of heat from buildings in cold weather.

It was found that every building material transmitted heat at a different rate and that each material also stored heat in different amounts so that the engineering laboratories were busy for several years determining these properties for all the known kinds of material, as well as the various combinations used in the modern dwelling.

These figures were checked with the actual experience in a number of residences and it was found that several other factors affected the loss of heat; namely, the velocity of the wind and the surface of the building material.

New instruments have come into use designed to check the heat losses from buildings as they are being used under actual conditions. An instrument has also been perfected to measure the air entering and leaving a building in a given time.

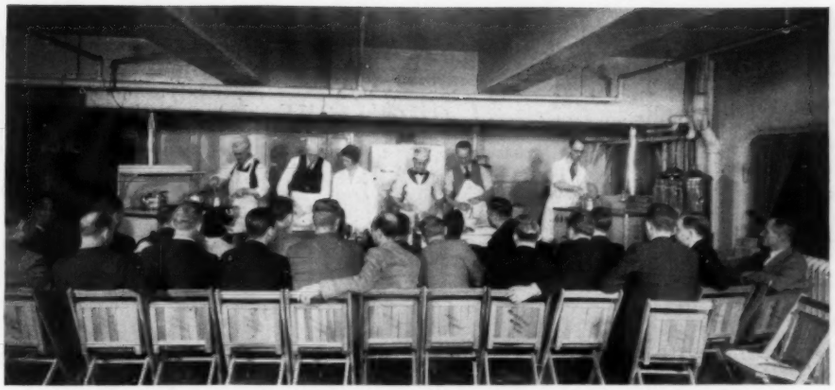
One of the problems that had to be settled was the method of determining the average daily temperature differences for any given locality. The standard method used is as follows: The normal mean temperature (as given by the local weather reports) for each month is subtracted from 65° and this amount is multiplied by the number of days in the month; adding the numbers for each month of the heating season gives the number of degree days for a normal season. (Example: St. Louis and vicinity, 4525).

The present method of figuring the heating requirements of residences is based on this heat loss through the different materials, making allowance for wind and temperature conditions. Knowing this heat loss and the heating value of the various fuels (determined by tests), the exact requirements for the season can be figured.

Due to its construction, relation to surrounding objects, elevation above surrounding country, etc., it is necessary to make a detailed estimate from actual measurements on each residence.

Insulation materials have been on the market for a number of years. They reduce the loss of heat from 15 per cent to 30 per cent, depending on the kind. Weather-stripping and caulking effect an additional saving, while automatic heat control, when properly installed, effects further economy. While these effects are not absolutely additive, reductions as high as 40 per cent have been obtained.

In the accompanying tabulation, the method of figuring the heat units lost per hour is shown for a house without insulation, weather-stripping, caulking, or automatic heat, while in the second table the figures are given when these improvements have been added to the house. The large saving is indicated in the difference in radiation required.



Appliance salesmen's cooking class of the Seattle Gas Co. in session.

Cooking Schools *and* Demonstrations *as* Conducted *at* Seattle

By BEATRICE STREGE

Seattle Gas Company

A WELL organized home service department is an asset to any public utility. There is a slogan used by a certain range manufacturer which reads "keep telling to keep selling," and which expresses in a few simple words the necessity for home service. Since women are the recognized purchasing agents of the nation, and since they are not greatly interested in the mechanical detail of an appliance beyond knowing that the one which they are about to purchase is substantially built and easy of operation, the selling points must be brought before them in a more appealing manner. Here is one place the home service department can prove its worth. By holding cooking schools, luncheons, teas, and other informal gatherings where the customer and the appliances are brought together, results are produced which work wonders in breaking down sales resistance.

Educational psychologists tell us "Knowledge comes before appreciation." This statement is proved by observing how a woman's appreciation of a gas stove increases as her knowledge grows through better understanding.

ATTENDANCE ON INCREASE

While this work has been carried on along very simple lines in the Seattle office, good results have been obtained. At the present time practically the only publicity given the cooking schools comes through the women themselves who have found the demonstrations interesting and educational. They have passed the word along to friends, who in turn have told their friends, and in a year the attendance has increased three times. Just recently a woman called on the telephone inquiring as to whether we were still holding cooking schools. She stated that she was from San Francisco, and had met a friend there who suggested that if she was ever in Seattle to be sure to attend the Seattle Gas Co.'s cooking schools, and that an afternoon spent there would be spent most profitably. During the past year, in addition to weekly cooking schools held in the modern gas equipped kitchen in the new Security Market, many special classes have been given.

Feeling that a salesman could better talk to a woman customer in her own language if he understood a few of the basic principles of cooking, special salesmens classes were given in the evening. The men did all the actual preparation and cooking of the food under supervision of a home service instructor, the men turning out cakes and oven dinners that would have done justice to the best of cooks. Frequently there were visitors at these classes, especially home service directors from the newspapers. On one of these occasions a salesman made and baked some biscuits which were such a success that Dorothy Neighbors, home service director of the Seattle Times, gave space for a story of the class and the recipe for biscuits on the women's page the following day. These instructions to salesmen have not been completed to date, but they have actually proved instrumental in closing orders which might have been lost had the salesman not been able to talk to the housewife from her own point of view.

The instructor in home economics of the University of Washington has invited a gas company home service representative to meet with the advanced classes in cookery for the past four quarters, and a friendly feeling of cooperation has sprung up in this way. Several gas ranges have been permanently installed in the laboratory, along with ranges using competitive fuels, and without exception, the home service worker has found a marked preference shown for gas.

FLOOR DEMONSTRATIONS

Main floor demonstrations and distribution of recipes was carried on for a number of months at the bill paying periods, in all the branch stores as well as in the main office.

Guest speakers have invariably brought large crowds to the auditorium, and it has been the department's experience that local bakers, chefs, and special representatives of food manufacturers are always glad of this opportunity for publicity.

During the entire time Seattle Gas Co. has enjoyed activities in Seattle, the home service directors of all three newspapers have given the company their close cooperation. Without exception gas appliances are used in all cooking

(Continued on Page 47)

A Practical Discussion of Conditions to Be Met in

APPLIANCE

By L. A. WHITE

IN the discussion published below the author contributes a practical chapter for the appliance service man. Mr. White's remarks were presented before the 11th Annual Meter Short Course and Conference, held last month at Ames, Iowa, under the joint sponorship of the Mid-West Gas Association and the Engineering Extension Service of Iowa State College.

To handle their duties efficiently appliance service men need to be well grounded in the fundamentals of their product. Particularly is this true at the present time in the Mid-West area, where manufactured gas is giving way to natural at many points.

Mr. White deals in this paper with differing characteristics of manufactured and natural gases, passing on to consider in detail the causes and remedies for many troublesome appliance conditions.—EDITOR.

IN the control of the service man is the future of the gas company. By his conduct, his understanding of the job, his application or the expeditious manner in which he executes his work, to the entire satisfaction of the customer, he is building confidence, good will, and friendly relations for his company.

A knowledge of the product with which he deals will do much to make possible the sympathetic, kindly understanding of the customers' troubles and a speedy effective remedy.

First, let us consider the product.

Until recently, nearly every gas company has had its own particular conditions as to gas compositions, pressures, appliances and burner adjustments. This situation certainly must have presented a problem for the manufacture of appliances.

In recent years we have been more or less closely standardized on a manufactured gas of a fairly uniform composition with a calorific value in the neighborhood of 550 B.t.u. Coal has replaced coke as a generator fuel and a fairly average distillate has been used as an enricher in the carburetor. It has been known as carburetted water gas. Still more recently we have seen natural gas of a fixed composition with an average calorific value of 1030 B.t.u., replacing the manufactured gas and opening up vast new fields.

The composition of the two gases with which we deal is analyzed in Table No. 1.

From this analysis it will be seen that we may determine the characteristics of the gas from the percentage of each individual component.

To understand these characteristics clearly a brief review of the chemistry of combustion will be necessary, but there are certain facts which every appliance man should know even though he lacks sufficient knowledge of chemistry to prove them.

1. That a British thermal unit is the amount of heat required to raise one pound of water through 1/180th of the difference between 32 degrees F. and 212 degrees F. Generally speaking, it is sufficient to assume a B.t.u. as the heat required to raise one pound of water one degree Fahrenheit.

2. That natural gas contains nearly twice the heat units of manufactured gas (1062 to 563).

3. That specific gravity is the relative weight of the gas considered with that of air (considering air as 1.0). That each of these gases is lighter than air.

4. That hydrogen and carbon monoxide are rapid burning gases.

5. That hydro carbons are slow burning gases.

6. That manufactured gas requires five parts air to one part gas for complete combustion.

7. That natural gas requires 10 parts air to one part gas for complete combustion.

With these few fundamental characteristics of our product in mind, we should be able to attack our problems with a degree of confidence.

Next, let us consider the distribution or conveyance of our product.

Since the main capacities and service piping have already been taken care of before we arrive upon the scene, our problem is in the proper design of the house piping. Whether it be on the original job or on later investigations the principles are the same.

We should know the B.t.u. requirements of each appliance (most of the manufacturers specify these requirements on the name plate now). We should also go over the future anticipated requirements and discuss their location with the customer, pointing out the advisability of providing for them at this time.

Now if we begin at a point most remote from the meter, or service entrance, and work back, using our pipe flow tables, bearing the following precautions in mind, we shall arrive at a very efficient layout which will do much to minimize future service calls, due to pressure and supply.

(a) Separate runs to large volume demands—Water heaters, furnaces, boilers, etc.

(b) Allowable pressure drop (under full load) 0.3 inches to 0.5 inches water.

(c) Ream all pipes carefully, removing all burs and obstructions.

(d) Test finished piping against 3 lbs/sq. inch for 10 minutes without perceptible drop.

Most of the flow charts are derived from the following formula:

$$Q = 1350 \sqrt{\frac{d^5 p}{1/3\ L\ g}}$$

Where Q=cu. ft. of gas per hour
d=diameter of pipe in inches
p=pressure in inches of water
L=length of pipe in feet
g=specific gravity of gas

For each elbow or T bend add the following to pipe lengths:

Diameter Pipe (in.)	¾	1	1½	2	2½	3
Equiv. Length (feet)	2	2	3	5	7	9

With the usual care in neatness of installation work, parallel lines well graded and neatly hung, we are now ready to test.

Pump up to 3 pounds and go over all joints carefully with a brush and soap solution or flushing oil. This should consume 10 or 15 minutes, and if the gauge shows no appreciable drop, you are ready to connect to the meter and admit gas to the system.

To get quickly into the subject of proper adjustments, let us assume that the locations of these appliances has been correctly chosen 12 inches from

SERVICING

Fort Dodge Gas and Electric Company
Fort Dodge, Iowa

the nearest wood surface not less than 6 inches clearance from oven bottom to the floor. Locations should be accessible, piping plumb and neatly done, holes in floor cut from top to avoid unsightly openings, and no piping defects.

We are now ready to proceed with the adjustment of the appliances for proper combustion. Most of this work is comparatively simple, but in order that we may effectively remedy difficulties which are bound to arise, we should have some fundamental facts in mind relative to the combustion and flame characteristics of the gases we are dealing with, and conditions which facilitate or hinder proper combustion.

There are three types of flames, after the manner in which the air is supplied for combustion.

1. Luminous flame.
2. Atmospheric or bunsen.
3. High pressure.

1. The luminous flame burner provides no primary air supply. The flame gets its secondary air by diffusion with the air into which the combustible gas issues. This should then be a lazy, long yellow flame.

2. The atmospheric or bunsen type with which we are most familiar is now luminous and gets its primary air by the effect of a differential pressure developed at the air port through the inspiration of the gas issuing from an orifice under high velocity through a throat entraining with it, and mixing in the mixing tube of the burner some of the air necessary for complete combustion. The remainder of the air necessary for complete combustion is obtained by diffusion and is called secondary air.

3. The high pressure flame is produced by mixing sufficient air or oxygen with the gas, before it issues into the combustion zone, to support complete combustion (more or less). The flame of this type is much smaller and hotter than the bunsen flame with which we are more familiar. It is generally employed in dental and welding torches.

Gas flames, with a fixed rate of fuel supply, will then be expected to vary in height with respect to the specific gravity, B.t.u. content, speed of flame propagation, and percentage of required primary air for complete combustion.

First the orifice size is required to pass a fixed amount of gas at a given pressure.

$$Q = 1658.5 \; K \; A \sqrt{\frac{H}{d}}$$

Q=rate of flow from orifice in cubic feet per hour.

A=area of orifice in square inches.

K=orifice discharge coefficient; varies from 0.6 @ 90 degrees approach to 0.875 with an 8 degree approach.

H=gas pressure in inches of water.

d=specific gravity of gas.

The volume of gas, the volume of the resultant primary air-gas mixture, and the resultant volume of products of combustion, should be understood and precautions taken to see that their escapement is not retarded.

The manufacturer has taken care of these conditions and has designed and constructed his burner and appliance to operate at maximum efficiency, but often conditions arise locally somewhat different than those for which the burner was constructed, and these conditions are the ones in which service men are chiefly interested.

Since the air-gas mixture in natural gas burning is about 11 times the gas required, and since this is about twice that required for manufactured gas, it stands to reason then that we shall have increased products of combustion in much the same ratio to care for. This is not difficult in the case of appliances designed for the purpose, but in converting one appliance to different gases, there are difficulties bound to arise.

Let us proceed to the adjustment of the kitchen range, which will answer for nearly all purposes since its burners are fundamentally the same as we shall find on all other types of appliances.

First we shall open the oven broiler doors to prevent all possibilities of explosion which sometimes occurs due to a leaky oven control, and since that is the only place where gas may collect in a restricted enclosure, we will be much safer to begin here.

The gas is turned on and ignited, and as soon as the air is expelled, the adjustment is begun.

A pressure gauge or portable U tube has been attached to a burner cock to make sure that the pressure remains normal. The following are the troublesome conditions which will be encountered and some of the remedies to be made for correcting these difficulties, both from the standpoint of new installation or later maintenance.

Oven burners are the most troublesome and probably the most carelessly handled. To diagnose an old case, get the history from the housewife. Adjust to a soft blue flame at approximately 34,000 B.t.u. per hour.

Conditions, causes, are:

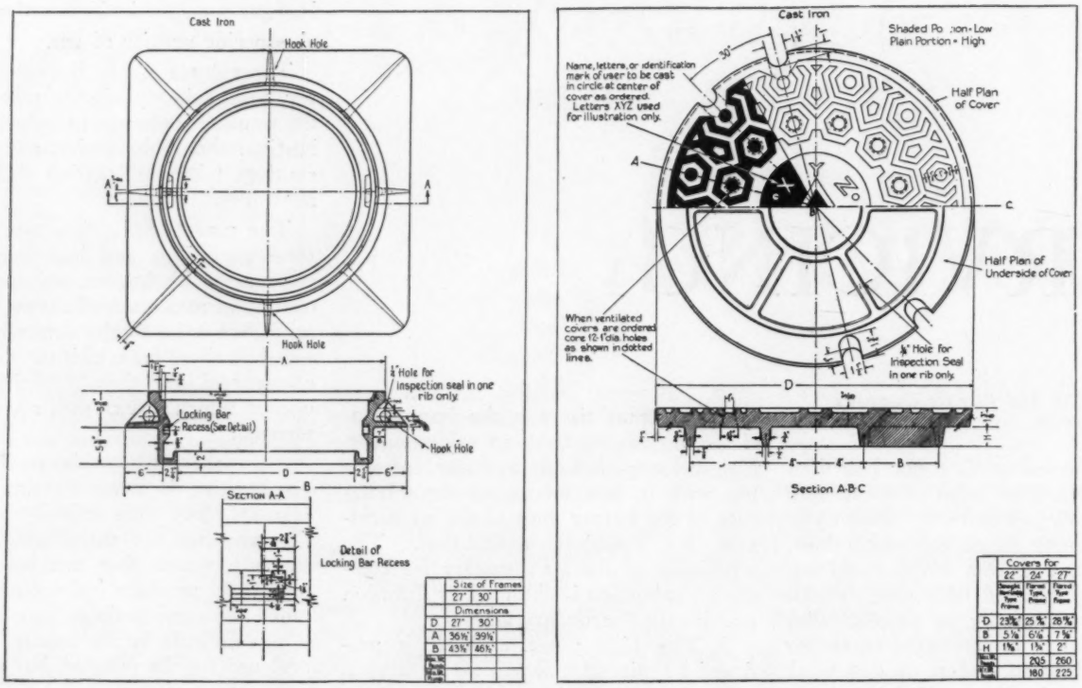
1. Baking burn on bottom, will not brown on top. Probably low sluggish flame overheating bottom and giving no circulation. Caused by:

Burner cracked or out of place.
Insufficient primary air.
Insufficient secondary air.
Burner too close to oven bottom.

(Continued on Page 37)

TABLE NO. 1

Formula	*Manufactured Gas*		*Natural Gas*	*Sp. Gr.*
C O_2	5.0%		0.0%	1.5291
O_2	0.6%		0.0%	1.1052
C H_4 (Methane)	12.8%		74.10%	.5543
H_2 (Hydrogen)	34.8%		7.89%	.0695
C_2 H_6 (Ethane)	9.4%	(20% Benzine		(.9749
		(80% Ethylene)	17.87%	(1.0492
C O	31.6%		00.00	.9672
N	5.87%		00.00	.9722
Calorific Value	563 B.t.u.		1062 B.t.u.	
Sp. Gr	0.63		0.68	


Cast Iron
Hook Hole
Hook Hole
Locking Bar Recess (See Detail)
Hook Hole
Section A-A
Detail of Locking Bar Recess
Cast Iron
Shaded Portion-Low Plain Portion-High
Name, letters, or identification mark of user to be cast in circle at center of cover as ordered. Letters XYZ used for illustration only.
Half Plan of Cover
Half Plan of Underside of Cover
When ventilated covers are ordered core 12-1/8in holes as shown in dotted lines.
Hole for Inspection Seal in one rib only.
Section A-B-C

LEFT: One of the 13 types of manhole frames recommended in American Standards Association proposed tentative standard. Frame shown is of the straight type, square base, for inner cover and locking bar, with 27-inch and 30-inch openings. RIGHT: One of seven types of recommended manhole covers.

Standardization *for* Manhole Frames *and* Covers

A PROPOSAL for an American Standard for manhole frames and covers containing recommendations for 13 types of frames and seven types of covers to replace the thousands of types now in use has just been published by the American Standards Association. The demand for innumerable, different designs and sizes of openings for manholes by the various public utilities and municipal supply departments which make use of manholes for their underground pipes and lines has caused many difficulties in manufacture and replacement of manhole frames and covers. The present concerted effort to standardize on a few sizes and styles is the result of these difficulties. Since 1924 a technical committee has been working on the subject under the procedure of the American Standards Association, going through a long process of elimination, selection, and redesign.

The number of utilities concerned with manholes is indicated by a list of the organizations which have been working on the formulation of the standard through representatives on the committee. These organizations include the American Electric Railway Association, the American Gas Association, the American Railway Association, the American Society of Municipal Engineers, the American Water Works Association, the Bell Telephone System, the National Electric Light Association, the Western Union Telegraph Company and the Postal Telegraph-Cable Company.

L. B. Fish, representing the Bell Telephone System, is chairman of the committee which prepared the proposed standard, and H. C. Dean, representing the National Electric Light Association, is secretary. The American Society of Civil Engineers and the ASA Telephone Group have been acting as joint leaders in the technical work.

The committee is now circulating a questionnaire to all those concerned with the production and use of manhole frames and covers to determine whether producers and users find the recommendations satisfactory or whether they wish to make suggestions for changes.

The proposed standard includes drawings showing designs and dimensions for the 13 types of manhole frames and the seven types of manhole covers which are recommended. It is believed that this limited number of frames and covers will meet the present requirements of the various utilities concerned.

The draft also includes specifications for hydrant and service valve boxes. Specifications are given for the gray-iron and carbon-steel castings to be used in the manufacture of manhole frames, covers, and boxes. Standard methods of test are provided by which both manufacturers and purchasers can determine compliance with the specifications. Following are the types of manhole frames for which standards are proposed:

Straight type round base

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Progress Toward the Goal of

Year-Round Air Conditioning

By EUGENE D. MILENER
Industrial Research Representative
American Gas Association

ALL but the very youngest gas men recall the successive steps in the development of gas refrigeration, which already, after a scant four or five years of commercial promotion, is adding appreciable revenue to gas systems. Now summer air-conditioning is undergoing its experimental period, with sufficient progress made to make it apparent that gas is on the threshold of a new and basic field of commercial and residential service.

E. D. Milener

Mr. Milener, who has been closely identified with air-conditioning research from its inception, presents a general survey of progress thus far recorded, in these excerpts from his discussion before the New England Gas Association's Industrial Division at Boston, Mass., December 11, 1931.—*Editor.*

THE adoption of gas for residential summer air conditioning—I prefer that term because cooling is only one function of producing comfort in the summer and in many localities it is a minor function—is important because not only is residential summer conditioning a new use for gas, it is a new use for heat and it can therefore, be called in every sense of the word *new* business.

A Summer Use For Gas

Anything that would be a *new* use for gas with a demand only in the summer would certainly be a boon to our business as it would require no plant, transmission or distribution investment.

In 1928, the Research Committee decided that, from the viewpoint of potentially wide application, no new summer use for gas heat energy offered quite the field that summer air conditioning did. This field covered every kind of building, including dwellings, and also included a growing field for summer conditioning in factories where a strong trend toward air conditioning to help certain manufacturing processes was noted.

At that time, summer air conditioning in theatres and in restaurants had made some headway. Those installations that had been made used electric or steam driven compression refrigeration systems and passed the air over cold coils.

However, there were three limitations to power-operated summer air conditioning noted at that time, that is in 1928. First—gas could not be used economically in connection with compression refrigerator systems. Second—refrigeration did not lend itself as easily as might be desired to dehumidifying, which, with cooling, constitutes the chief functions of summer air conditioning. Third—experience has shown that air from compression refrigerating systems could not be distributed through heating ducts of the type already installed in thousands of buildings, but required a separate set of ducts designed on what is known as the "down draft" system; and fourth—compression refrigeration equipment was of such a nature that it was practically limited to commercial and industrial buildings and was not suitable for dwellings.

The Research Committee not only wanted to project gas into the summer air conditioning field as a competitor of electricity and steam in large buildings, but it wanted to go beyond that and let gas lead the way in introducing true summer air conditioning into American homes. Taking the four conclusions which it reached regarding power summer air conditioning, let us see what further conclusions could be deduced that would serve as a sort of general set of specifications that would not only allow gas to enter the picture but would possibly result in the public securing a better quality of summer air conditioning than they could expect from power operated devices.

First: Could gas be used for firing steam boilers which in turn would supply steam for the types of turbines used for operating air conditioning machinery? Trough the courtesy of Willis H. Carrier, and with the cooperation of the Committee, extensive studies were made of the economics of this possible method of applying gas to boilers driving turbines, and it was shown that in both the north and in the south gas would not be in a particularly favorable competitive position with other sources of power.

Second: It was determined that the ordinary heating ducts could be used if the air could be properly conditioned before it enters the room. Experience with power driven summer air conditioning had clearly shown that considerable diffusion with other air in the room is necessary on its way down from the overhead ducts before it reaches the occupants of the room. This is probably due to the excess cooling resulting from the way that power jobs are usually operated. But more on the subject of excess cooling later.

Third: The central power operated refrigerating system did not lend itself to complete automatic operation and freedom from state and insurance inspection in the sense that we gas men think of central gas heating plants being automatically operated. The Committee believed that that was a necessary qualification for residences and believed it would be possible to develop gas operated plants that would meet those qualifications.

Fourth: The Committee believed that excess cooling would serve to discredit summer air conditioning in the long run and decided it was sound engineering to provide, if possible, for separate cooling and dehumidifying and for separate control of these functions. This had not been done before.

Cooling and Dehumidifying

Let us pause right here to get a better understanding of just what constitutes proper "summer air conditioning." Most people call it cooling, but that is not the proper word and overlooks other functions that are just as important, if not more important, which indeed I think is the case. The ideal of the gas industry, of course, is to give year round air conditioning service to the buildings where our meters are located. We are

doing part of that now, with the finest automatic winter air conditioning that has ever been available, but it is confined strictly to the winter insofar as the use of gas is concerned. Year 'round air conditioning involves six operations; two exclusively used in the winter, and two exclusively used in the summer, and two that are used the entire year. They are heating and humidifying, or moistening, the air in the winter; cooling and dehumidifying, or drying the air in summer; and circulating and cleaning the air at all periods of the year. Now the art has for some time been developed to the point where very desirable and well made gas equipment is on the market for doing four of those functions. These are: heating, humidifying, circulating and cleaning. And the gas companies sell the heat energy necessary for heating and humidifying. But cooling and dehumidifying have been the missing links in the year 'round air conditioning cycle insofar as gas was concerned in all kinds of buildings and for practical purposes where any source of energy was concerned in dwellings.

The job was therefore to devise ways for transforming gas heat energy into cooling and dehumidifying and we looked forward to the day when our customers would not buy a warm air heater but would buy a year 'round gas operated air conditioner, probably as one single unit.

The Research Committee scoured the country to see if there was any work under way, or contemplated, that gave promise of developing into a vehicle for using gas heat energy for cooling and dehumidifying safely, automatically and economically for summer air conditioning purposes. It was already in touch with several gas refrigeration investigations, that might lead to developments into large sizes, but none of these except one met the safety requirements of household summer air conditioning. Events later showed that this refrigerator could not be made to work in large sizes with even reasonable efficiency.

With no suitable refrigeration developments under way and with the knowledge that to attempt to start from scratch in developing one would involve years of time and many, many thousands of dollars and also having faith in its theory that cooling and dehumidifying, being separate functions, should be done separately, the Committee decided that direct dehumidifying, possibly by adsorption of the moisture from the air, was a possible method of attack and that actual cooling should be reduced to a minimum. This reduced amount of cooling could be done by water coils from tap water, by compression refrigeration, by large gas refrigeration units, if, as and when developed; or by a method known as re-evaporation whereby the air is dried by adsorption; far below the normal building requirements, from which condition it will cool if a limited amount of water is allowed to re-evaporate into it.

The point that had been overlooked by most people is that, in the majority of localities, the actual energy requirements for dehumidifying are much greater than the energy requirements for actual cooling. We felt that if cooling was reduced to the smallest possible point and emphasis was laid on dehumidifying, that we could immediately apply gas to an adsorbant and in addition give a better quality of summer air conditioning than people were heretofore accustomed to.

Development of Gas Summer Conditioning for Large Buildings

It was found that a substance known as Silica Gel apparently had all the requirements for adsorbing the moisture out of air and that it could be regenerated any number of times with gas heat. It had been used successfully in many industrial operations. Negotiations were opened with the Silica Gel Corp. and the Committee assisted in some research that they did which resulted in a test installation in a theatre in Pennsylvania. That summer (1929) much experience and much grief were encountered, but based on that experience two bank building installations were made in Baltimore, Maryland, and went through the summer of 1930 in pretty good shape. After some changes they were accepted by the building owners, paid for and are now regular parts of the mechanical equipment of the buildings. These installations use tap water for cooling and heat energy for regenerating the Silica Gel after it has adsorbed the moisture from the air.

The following winter, 1930-31, the Committee learned that the Dallas Gas Co. was to erect a new building and was instrumental in having the company purchase and install a gas operated dehumidifyer with electric compression refrigeration for cooling. (The electricity is generated with gas engines in the building.) This got under way the beginning of August and gave very good satisfaction for two months, or until the heating season arrived. The success of these installations led the Library Board of the City of Baltimore to specify gas summer air conditioning with tap water cooling for the new three million dollar Central Public Library Building. This was adopted in the face of the severest kind of competition from compression refrigeration men who, of course, were not anxious to see heat energy get a foothold in this field. They took the awarding of the contract under the specifications to court but lost out. This library is now under construction and will provide a summer gas load of about 6000 cubic feet per hour.

I have traced the history of the development of applying gas heat energy to summer air conditioning as applied to large buildings. The Association's Research Committee has worked year in and year out to help bring this about and was able to do so at no expense to the gas industry except the slightest expense of its own personnel. Thus there has been born a brand new use for gas with purely summer load characteristics and which is also suitable for installation in factories where certain very close control over the atmosphere is desirable, such as in cork drying, film drying, etc. Estimates are now being given for large buildings, for industrial process work and for conditioning pneumonia rooms in hospitals, and no doubt next year will see more such places providing outlets for the sale of gas in the summer time.

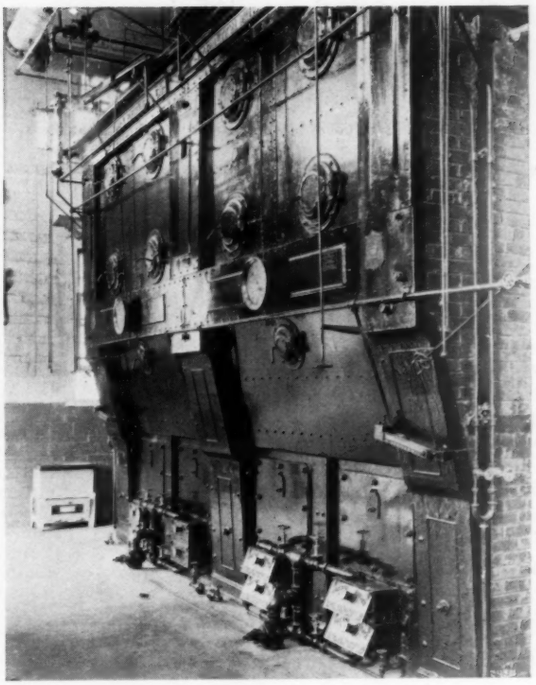
But what about summer air conditioning in dwellings? For two years after it set up its general specifications as to what a central residential summer air conditioning system would have to meet, and after it had determined that electric compression systems probably could not meet them, the Committee contacted all interested parties, advised with them and took advantage of what experience they had had, before deciding upon a course of action. But practically no one had had any experience with air conditioning whole dwellings in summer. All the experience had been in commercial buildings, that is, in buildings where people only stayed for an hour or two at the most. No one really knew just what would be the reaction of people living day and night, week after week during the entire summer in air conditioned dwellings. True, some deductions had been made from laboratory tests and charts of effective temperatures, but the extent to which they would hold under strictly residential conditions was one of the important things to find out. But, we felt from the beginning that the chilling condition found in theatres and restaurants would never do in residences.

Public interest in summer air conditioning was beginning to grow and the work which the Association had been doing toward developing gas operated units for large buildings was focusing some attention in engineering circles to gas for this purpose. It was therefore deemed desirable to acquaint the

(Continued on Page 52)

Controlled Heat *for* Milk Condensing

By H. L. WOLF
Industrial Engineer, Coast Counties Gas and Electric Company



Two 200 H. P. boilers fired by four gas burners in the plant of the Carnation Co. of California at Gustine, Calif., served from the lines of Coast Counties Gas and Electric Company, Santa Cruz.

THE Carnation Co. of California has recently joined the ranks of the large industrial users of natural gas in the San Joaquin Valley, having just completed the conversion of their plant No. 23 at Gustine. Although the plant has been in use but a short time, Manager M. M. Fullerton states that natural gas has already proven itself to be clean, steady and easily controlled, as well as economical in operation. Where three boilers were formerly needed to handle steam requirements, the load is now being carried by two natural gas-fired boilers.

H. L. Wolf

Steam from these boilers is used throughout the entire condensing process from the time the fresh milk enters the plant until it leaves in the neat, trim cans to be found on the shelves of almost every grocery. Absolute cleanliness is the first important factor in the condensing of milk and natural gas fuel eliminates the possibility of any smoke, soot or ashes around the plant. Also, since natural gas is practically odorless in its combustion there is no opportunity for the milk to become in any way contaminated from it during the process. Another advantage lies in the constant steam pressure maintained by means of natural gas firing, making possible better temperature control, which again is very necessary in the proper handling of milk since a slight variance may be the means of ruining the taste and texture of the finished product.

Careful inspection of this milk condensing process illustrates how important it is to have the correct heat in the proper place at all times, and how this is most effectively taken care of by natural gas, from the sterilization of equipment and the actual evaporation of the milk to the soldering and drying of the cans, so they will remain bright and new.

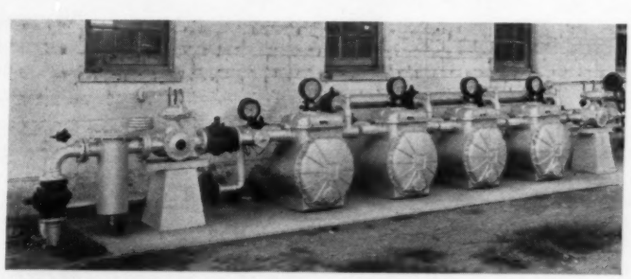
As soon as the milk is delivered to the plant by the contract haulers, who gather it twice daily from the dairymen, it is inspected, weighed and a sample taken from each shipment. This sample is later tested for butterfat, which is the basis used in paying the dairymen for the milk. The milk is then pumped over coolers and into storage tanks where it is held until time for evaporation.

This is accomplished by first passing the milk through a preheater and then into vacuum pans where about 50 per cent of the water is evaporated. These vacuum pans enable the water to evaporate at a temperature of approximately 125°F., rather than 212°F., which would otherwise be necessary. This does away with the "boiled milk" taste which would be inevitable if the higher temperature were used.

From these vacuum pans the milk passes through a Homogenizer under a pressure of 1500 pounds. This breaks up the molecules of fat and penetrates the cream from separating and rising to the top, as in fresh milk. This also makes the condensed milk easier to digest than fresh milk and is the reason it is highly recommended by physicians as an infant food. After the milk is homogenized, it is cooled to a temperature of about 38°F. by means of brine coolers and then placed in glass-lined storage tanks to await canning. In the Gustine Plant of the Carnation Co. there are eight of these storage tanks, each with a capacity of about 4000 gallons.

The cans in which the evaporated milk is to be placed are loaded from the freight car directly into a conveyor which feeds them to the capping machine. Here they are placed on the rim of the machine, which resembles a rotating wagon wheel. The evaporated milk then flows from the storage tanks into a float tank and is piped to the capping machine, where it flows down the center of the wheel and is distributed into small tubes directly above the small opening in the cans, which are filled with one revolution of the wheel and the opening

(Continued on Page 48)



Metering installation at the Carnation Co. Gustine plant. Metric positive displacement meters, Emco regulators and Nordstrom valves are shown in the set-up above.

Pacific Coast Gas Association

Managing Director: Clifford Johnstone

Association Headquarters: 447 Sutter St., San Francisco

President: Jas. L. Stone

Vice-President and Gen. Manager, Spokane Gas and Fuel Co.

Mid-Winter Conference, Feb. 17-18

A TWO-DAY program of special merit has been arranged for the Association's Mid-Winter Conference, which will be held on February 17 and 18 at Los Angeles, Calif. All meetings will be in the Los Angeles Gas and Electric Corp. building at 810 South Flower St. Provision has been made for Section conferences, a dinner meeting, and a general session program, the full details being as follows:

WEDNESDAY, FEBRUARY 17

10:00 A.M.—General Session

Auditorium, 12th Floor

President James L. Stone, Presiding

"Organization and Objectives of Proposed Manufacturers' Section"—R. L. Hinckley, Chairman, president, General Water Heater Corp.

"Cooperative Selling Campaigns"

In Southern California—F. M. Banks, general superintendent of sales, Southern California Gas Co.

In Northern California—B. W. Reynolds, dealer representative, Pacific Gas and Electric Co.

"What Activities Does the Gas Industry Need to Stress Most Now?"—An Open Discussion Conducted by President Stone.

2:00 P.M.—Separate Meetings of Sections

Accounting Section—Room 502.

Progress Reports of Committees and Discussion of Committee Work and Accounting Problems.

Commercial Section—Room 830.

Progress Reports of Committees

Paper—"Potato Chip Cooking"—G. H. Heckler, Southern California Gas Co. Under auspices of Industrial Data Sheet Committee.

Paper—"Gas Company Cooperation with Dealers"—Dohrmann Hotel Supply Co. Under auspices of Hotel and Restaurant Committee.

Paper—"Home Service"—Katherine L. Rathbone, Southern Counties Gas Co. Under auspices of Home Service Committee.

Paper—"Distress Oil and Its Effect on Industrial Gas Sales"—H. H. Foreman, Southern California Gas Co. Under auspices of Industrial Gas Competition Committee.

Illustrated Paper—"Gas Furnaces in Metal Treating Plants"—James J. Knapp, Jas. H. Knapp Co. Under auspices of Heat Treating Committee.

Publicity and Advertising Section—Room 713.

Technical Section—Room 926.

Progress Reports of Committees

Motion picture showing construction of Arrowhead 4-inch transmission line, with particular reference to safety measures employed. Presentation and explanation by W. P. Dawe, Southern California Gas Co. for Accident Prevention Committee.

Paper—"Flow of Gas in Distribution-Feeder Mains"—N. L. Hoff, Los Angeles Gas and Electric Corp., chairman Distribution Design Committee.

Paper—"Effect of Moisture on the Rate of Corrosion"—M. T. Burton, Southern California Gas Co. Under auspices of Pipe Protection Committee.

General Discussion of Reports and Program.

6:45 P.M.—Dinner Meeting

Auditorium, 12th Floor

$1.25 per plate. Ladies expected. Music by Los Angeles Gas and Electric Corp. Orchestra.

Vocal selections by Downey Quartette of Southern California Gas Co.

Address—"Beginning at Jerusalem"—D. L. Scott, Manager of Public Relations, Los Angeles Gas and Electric Corp.

Address—"Advertising's Task in the Return to Normalcy"—Dr. Winfield Barkley, assistant manager, Advertising and Publicity Department, Bank of America.

Skit—"A Fiance for Fanny"—by members of the New Business Department, Los Angeles Gas and Electric Corp.

THURSDAY, FEBRUARY 18

9:30 A.M.—Separate Meetings of Sections

Commercial Section—Room 830.

Progress Reports of Committees

Paper—"Trend of Boiler Design"—W. M. Jacobs, Southern California Gas Co. Under auspices of Natural Gas Conversion Committee.

Paper—"Development of Gas Engine Power in Southern California"—Western Enterprise Engine Co. Under auspices of Gas Engine Committee.

Paper—"Industrial Advertising"—J. Chas. Jordan, Pacific Gas and Electric Co.

Technical Section—Room 926.

Joint meeting of Production and Natural Gas Committees.

Paper—"Deviations from Boyle's Law"—Phillip Beckman, Pacific Gas and Electric Co.

"Meeting the Gas Industry" by Lee Holtz, Southern California Gas Co. A motion picture.

Reports of Committee Chairmen and discussion of program.

12:15 P.M.—Luncheon

Auditorium, 12th Floor

75 cents per plate. Whistling and Accordian solos by Hegwer and Carsten of Los Angeles Gas and Electric Corp.

2:00 P.M.—General Session

Auditorium, 12th Floor

Address—"As Ithers See Us"—Henry C. Newton, A.I.A., H. C. Newton and R. D. Murray, Architects.

Paper—"When It Snows in Southern California"—R. M. Bauer, Office Engineer, Southern California Gas Co.

Address—"The Inter-Relations of Credit and Business in Developing Our Modern Commerce"—Dr. J. Harry Tregoe, Director Credit Economic Council, Los Angeles.

Cooperative Advertising Set-Up Announced

THE Committee on Cooperative Advertising, under the chairmanship of J. Chas. Jordan of the Pacific Gas and Electric Co., announces that it has completed plans and financing for the continuance of the Association's program of advertising in some 18 trade journals of Pacific Coast circulation.

J. C. Jordan

The industries reached through this advertising are very large potential users of gas, and the purpose of the campaign is to keep these industries fully informed as to the economies and efficiencies which gas fuel can bring to their varied operations. Special industries which will be reached include the building trades, plumbing and heating trade, steel and soft metal trades, baking industry, candy industry, laundries, dairy industry, hotels and restaurants, and factory owners.

The committee also plans a campaign to inspire retail gas appliance dealers to further effort in selling quality gas appliances.

In addition to the display advertising which this program contemplates, the committee will also distribute timely articles on specific installations. This activity will continue in charge of H. Elliott Taylor, San Francisco manager of *Western Gas*.

For the time being the radio program, conducted as a part of the Woman's Magazine of the Air of the National Broadcasting Co. for the past two and a half years, will be discontinued, the last broadcast being on February 3.

Gas Facts Slighted in Home Building Report

THE necessity for constant vigilance to prevent propagandizing of competitive industries is illustrated by a number of committee reports rendered to the President's Conference on Home Building and Home Ownership held early in December at Washington.

Such committees as those on Home Information Services and Centers, Reconditioning, Remodeling and Modernizing, Kitchens and other Work Centers, Standards and Objectives, Fundamental Equipment, and Technological Developments were asked to consider their subjects from the standpoint of the low-priced home ranging in cost from $2,000 to $10,000.

It is surprising to note that most of these committees came forward with descriptions of equipment of the most expensive and wasteful type, in many cases recommending equipment whose cost alone would exceed the price limits set upon the entire house in the President's directions, leaving nothing for such necessary adjuncts as floors and roofs. Most of these committees were evidently sold that this is an electrical age and that to be modern, all heating, water heating and cooking must necessarily be done electrically.

These reports are without question a warning of the need which exists for increased advertising and publicity by the gas industry. Needless to say the gas industry, as represented by the American Gas Association, regional associations and individuals, has risen en masse to protest against the injustice done it. The American Gas Association has prepared detailed criticisms of the text of all of the above mentioned reports and has forwarded these criticisms to the Secretary of Commerce. The Pacific Coast Gas Association has written all members of Congress in its territory asking them to protest the distribution of these reports to the public until the data submitted by the American Gas Association has been fully considered.

Sales Program Subject of Appliance Society Session

THE 1932 gas sales program of the Pacific Gas and Electric Co. was announced in San Francisco at a dinner meeting sponsored by the Gas Appliance Society of California, on January 27. George Egleston presided as chairman, and introduced O. C. Bunster, president, and R. E. Fisher, vice-president in charge of public relations and sales, both of the Pacific Gas and Electric Co.

Commenting on the year that has closed, it was shown that whereas the 1931 sales program of the Pacific Gas and Electric Co. in cooperation with the dealers in gas appliances, had been estimated at $6,175,000, actual sales amounted to $7,582,000. The estimated market outlook for 1932, which in a sense is a sales quota for gas company and dealers, has been set at $7,000,000, an increase of almost $1,000,000 over last year's preliminary estimate, although approximately $500,000 under last year's actual accomplishments.

Outstanding items in the market outlook list are as follows:

Gas ranges, $2,200,000.
Water heaters, $1,050,000.
Furnaces and boilers, $1,500,000.
Small heating appliances, $1,000,000.
Commercial and industrial heating equipment and domestic conversion burners account for the remaining $1,250,000.

During the year, the sales department of the Pacific Gas and Electric Co. will spend $692,999 on development work, including dealer helps and other sales activities; 225 men will be employed.

The advertising budget for newspapers, billboards and other media has been set at $130,500.

Over 500 gas appliance and furniture dealers and gas company executives and employees were present, constituting the largest meeting of its kind the Gas Appliance Society has ever held. Speaking for his own organization, President Bunster expressed approval of the utility's sales program and urged that it be utilized to the fullest advantage by dealers throughout the territory.

Northwest Commercial Section Meeting

ON January 22 an interesting Commercial Section conference was held in Tacoma, Wash., under the leadership of R. W. Coblentz, vice-chairman of the Association's Commercial Section and assistant general manager of the Washington Gas & Electric Co. The attendance was well over 50, representing all of the larger companies in Oregon, Washington and British Columbia. President Jas. L. Stone attended the conference and contributed notably to the discussions.

The conference opened with a dinner on the evening of January 21, attended by managers and sales managers of gas companies in the Northwest. This evening was devoted to an earnest discussion of the business situation, particularly with reference to the efforts all companies are making to interest dealers in gas appliance merchandising. The recent action of the Board of Directors of the Association in recommending to member companies that they adhere to the merchandising rules promulgated nationally by the American Gas Association, was endorsed, as was also the recommendation that an active educational campaign with dealers be carried on.

The entire morning session on January 22 was devoted to a discussion of new gas range models and the plans of the manufacturers for the future. Representatives of the American Stove Co., the Estate Stove Co., the Jas. Graham Manufacturing Co., and the Tappan Stove Co., discussed the manufacturers' problems. Radical changes in models such as took place in 1931 are not expected to occur in 1932. Prices are probably at their lowest point and one manufacturer went so far as to guarantee purchasers against price decline for six months. Gas company men felt that this assurance would assist in closing many sales.

The afternoon session was opened by Miss Beatrice Strege of the Seattle Gas Co. and chairman of the Association's committee on Home Service. Miss Strege discussed the responsibilities of Home Service as worked out by the Seattle Co. Particularly interesting was her reference to the instruction of salesmen in the rudiments of cooking. Her paper appears on another page of this issue.

M. C. Hancock, Aberdeen manager of the Washington Gas & Electric Co., discussed the results of some recent cost comparisons between gas and electricity for water heating. They indicated the extremely low rate necessary to permit electric water heaters to compete on an even basis with even high cost, low B.t.u. manufactured gas. President Jas. L. Stone described experiences in Spokane with small capacity flat rate gas water heaters designed by the Spokane organization to compete with a similar electric service. Large, well insulated tanks (40 gallon minimum) and low capacity burners (7 to 10 cubic feet per hour) are features of these heaters which give a considerably cheaper and better service than their electric competitor.

There followed a discussion of house heating, led by John Fremont, gas sales manager for the British Columbia Electric Power & Gas Co., Vancouver. The Vancouver company has met with considerable success in its househeating sales. Mr. Fremont ascribes this success and the popularity of gas heat to the care exercised by the company in

selling it, particularly with reference to promises made to prospects and the type of installation made. No unsatisfactory jobs are permitted. This is in distinct contrast to the competitive type of work sometimes found in other cities.

Ray Trowbridge of Seattle Gas Co. described the budget system used by his company in selling house heating. Over 100 customers are now receiving service on this basis with satisfaction. Its requirements are that very careful estimates of gas usage be made, and an average monthly bill computed. The customer is billed this average each month during the year, but at the same time is given actual consumption figures. At the end of the year the adjustment is made.

At another point in this issue Mr. Fremont's and Mr. Trowbridge's discussions are reviewed in more detail.

At the evening dinner the speaker of the evening was J. Earl Jones, commercial manager of the Seattle Gas Co. Mr. Jones' topic was the new optional therm rate of his company. In these rates one-tenth therm or 10,000 B.t.u.'s is taken as the sales unit, this being equivalent to approximately 20 cubic feet of Seattle gas. A general service therm rate is offered and also a number of special inducement rates for cooking, water heating, refrigeration, and space heating. Some of these inducement rates go as low as 1 cent per unit and they are proving their effectiveness as load builders.

Natural Gas Transmission Committee

F. F. DOYLE, Chairman of the Natural Gas Transmission Committee, announces the formation of the following committees:

Compressor Stations

Grove Lawrence, Southern California Gas Co., chairman.
Phillip Beckman, Pacific Gas and Electric Co.
Leal Davis, Pacific Gas and Electric Co.
W. K. Dodd, Southern California Gas Co.
S. S. Donaldson, Southern California Gas Co.
O. A. Philpott, Pacific Gas and Electric Co.
C. S. Pool, Ventura Fuel Co.
T. C. Wallace, Southern Counties Gas Co.

Large Volume Measurements

R. L. Cook, Southern California Gas Co., chairman.
K. B. Anderson, Coast Counties Gas & Electric Co.
A. R. Bailey, Coast Counties Gas & Electric Co.
Phillip Beckman, Pacific Gas and Electric Co.
J. A. Calhoun, Southern California Gas Co.
M. J. Cereghino, Los Angeles Gas and Electric Corp.
H. M. Dwight, Southern California Gas Co.
H. A. Hurley, Southern California Gas Co.
Wm. La Violette, Pacific Gas and Electric Co.
L. F. Reitz, Pacific Gas and Electric Co.
Edgar Wilde, Southern Counties Gas Co.
F. H. Winslow, Southern Counties Gas Co.

Transmission Pipe Lines

B. M. Laulhere, Los Angeles Gas and Electric Corp., chairman.
Bert Embry, Southern California Gas Co.
H. S. Harris, Los Angeles Gas and Electric Corp.
F. A. Hough, Southern Counties Gas Co.
O. A. Philpott, Pacific Gas and Electric Co.
Clayton Pickup, Southern California Gas Co.
W. M. Pipkin, Southern Fuel Co.
R. R. Ripley, Montana Power Co.
F. E. Wilson, Pacific Gas and Electric Co.

Distribution Conference, April 6-8

THE Ninth Annual Conference of the Distribution Committee, Technical Section, American Gas Association, will be held at the Tutwiler Hotel, Birmingham, Ala., April 6, 7 and 8, according to announcement made at Association headquarters in New York.

F. A. Lydecker, general superintendent of distribution, Public Service Electric and Gas Co. of Newark, N. J., chairman of the A.G.A. Distribution Committee, with the assistance of a Program Committee, selected Birmingham as the meeting place because that city offers a central location, convenient to both the manufactured and natural gas distribution men alike.

Among other things, the committee in charge plans to have papers presented on latest developments in pipe joint research, gas unaccounted for studies, and new and up-to-date developments in the change-over from manufactured to natural gas. In addition to these and other interesting topics for discussion, there will be a symposium relating to the servicing of automatic appliances.

Work so far accomplished indicates that the program will be one of unusual interest to all distribution men as well as to others connected with distribution problems.

Percy Black Named Mgr. of Everett District for W. G. & E. Co.

Percy Black has just been appointed district manager of the Washington Gas & Electric Co. at Everett, Wash.

Mr. Black entered the gas utility field about four years ago in the general sales division of the Portland Gas & Coke Co. His results in this work led to his appointment in the apartment house division.

He was then appointed to head the apartment house division of the Seattle Gas Co., Seattle, Wash., where he remained until his most recent appointment.

1932 Calendar

February

Mid-West Regional Sales Conference—Commercial Section, American Gas Association, Hotel Sherman, Chicago, Ill., February 16, 1932.

P. C. G. A. Mid-Winter Conference—Los Angeles, Calif., Feb. 17-18, 1932.

Manufacturers Section Meeting—American Gas Association, Palmer House, Chicago, Ill., February 18, 1932.

Southern California Meter Association—Los Angeles, Calif., February 25, 1932.

March

Oklahoma Utilities Association—14th Annual Convention, Tulsa, Okla., March 8-9, 1932.

April

Distribution Conference — American Gas Association Technical Section, Ninth Annual Convention, April 6-8, 1932.

Mid-West Gas Association—Annual Convention, St. Paul, Minn., April 11-13, 1932.

Southern Gas Association—Annual convention, Tutwiler Hotel, Birmingham, Ala., April 19-21, 1932.

Missouri Association of Public Utilities—Annual Convention, Elms Hotel, Excelsior Springs, Mo., April 28, 29 and 30, 1932.

May

Natural Gas Department, American Gas Association—Annual Convention, Tulsa, Okla., May 9-11, 1932.

June

Canadian Gas Association—25th Annual Convention, Fort Garry Hotel, Winnipeg, Manitoba, Can., June 9 and 10, 1932.

July

Michigan Gas Association—Annual Convention, Grand Hotel, Mackinac Island, Mich., July 5-7, 1932.

August

Pacific Coast Gas Association — Thirty-ninth Annual Convention, Spokane, Wash., August 23-26, 1932.

October

American Gas Association—Annual Convention, Atlantic City, N. J., October 10-14, 1932.

Dunlap Appointed Manager for Kansas Pipe Line at Valley Falls

Bryan Dunlap has been named to the post of manager of the Valley Falls, Kan., office of the Kansas Pipe Line & Gas Co., Salina. Mr. Dunlap was formerly manager for the company at Clay Center.

Gas was turned into the Valley Falls mains during the middle of January.

Reorganizing American Commonwealths Power Corp.

Reorganization of the American Commonwealths Power Corp., Grand Rapids, Mich., now in receivership, is progressing, with possibilities of completing the reorganization without loss to the company of its important operating subsidiaries. It is reported that Chase National Bank has agreed to carry a secured note of the American Community Power Co., a subsidiary, in order to give more time to the receivers to work out a plan for putting the company on its feet.

It is reported also that the United States and Foreign Securities Corp. has retained an interest by purchasing a $1,707,000 debenture issue of another subsidiary, the American Gas and Power Co., from A. E. Fitkin, who had purchased a controlling interest in that company.

The company consented to the appointment of receivers for the protection of its creditors and stockholders because of its inability to pay or refinance a secured loan of approximately $3,000,000 which matured on January 2, and a note issue of American Community Power Co. which matured on November 1, 1931.

John K. Garrigues, Herbert W. Briggs and Herbert L. Nichols, 120 Broadway, New York City, were appointed on January 4 as receivers, and took possession of the assets, property and records of the corporation.

E. P. Gosling Takes Post of George B. Evans, Resigned

EDWARD P. GOSLING, for the past year vice-president and general manager of The Laclede Power & Light Co., has been named to succeed George B. Evans as president of the Laclede Gas Light Co., St. Louis, Mo. Mr. Evans resigned, effective January 1.

E. P. Gosling

Mr. Gosling was formerly vice-president and general manager of the Newport Electric Corp. of Newport, R. I., also a property of the Utilities Power & Light Corp., parent company of Laclede Gas Light Co. and Laclede Power & Light Co.

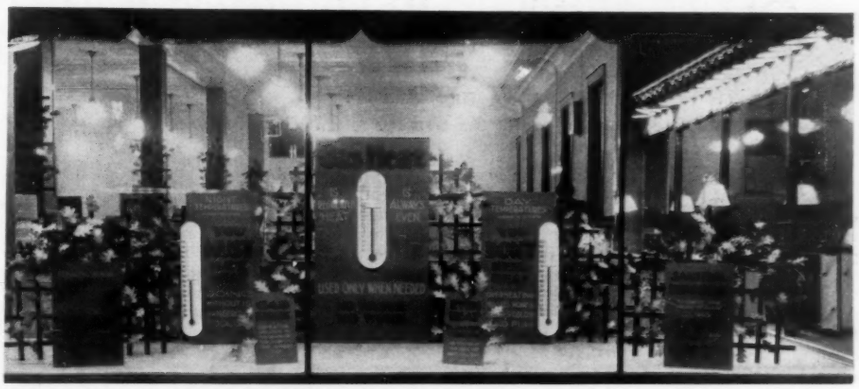
Mr. Gosling takes charge of the Laclede properties with a fund of experience in utility management, having been engaged in utility work for 40 years and has managed properties since 1903.

In Newport Mr. Gosling was active in civic and state affairs, having been president of the Newport Chamber of Commerce at the time of his departure for St. Louis. He has established permanent residence in St. Louis.

Line Completed to Clinton; Merchandising Activities Begun

Southern Gas Utilities, Inc., Jackson, Miss., reports the completion of a line from the Jackson field to Clinton, Miss., to serve Clinton, Mississippi College and Hillman College. There will be approximately 200 domestic meters in use, including several in suburban districts.

A separate merchandising organization known as the Southern Utilities Merchandising Co. has been formed to sell appliances, and has outfitted a show room and office in Clinton.



Something New in House Heating Display

ALBUQUERQUE Gas and Electric Co., Albuquerque, N. M., carried on an active house heating campaign during the early fall months, selling both furnaces and conversion burners. In some of the house heating window displays an unique idea was used in that no appliances were shown, the lay-out depending on color and design to put the message across, according to H. L. Pinkerton, sales supervisor for the company.

The thermometer display shown here was done in warm colors—reds, browns and yellows. Autumn leaves of the same colors were used to trim the lattice panels. The display panels were constructed of wallboard and the thermometers were cut out of the same material and mounted away from the main panels. Average day and night temperatures for the month were shown on the side panels and the main panel was used to show a constantly maintained temperature of 70 degrees made possible through the use of automatically controlled natural gas heat.

North Central Gas Co. Planning Extensions for Coming Year

North Central Gas Co., headquartered at Casper, Wyo., is planning several extensions during 1932 if franchising work is carried through which is now pendng in its territory.

A 25-mile line will be built from the reconditioned oil carrier which is now the main line of the North Central Gas Co. to serve Sidney, Neb., leaving the carrier at a point slightly east of Bridgeport, Neb., and running south through Dalton into Sidney. A franchise election is scheduled to be held in Sidney in March.

A second 25-mile lateral will probably be constructed to serve Alliance, Neb., where a franchise application is to be voted upon in March.

Lingle, Wyo., has signified its desire to be served with natural by granting a franchise last year, a short lateral to serve the town being planned.

A. W. Lee Named Vice-Pres. of Louisville G. & E. Co.

T. B. Wilson, president, Louisville Gas and Electric Co., Louisville, Ky., announces that the board of directors of the company at its meeting on Thursday afternoon, January 21, elected Addison W. Lee as vice-president in charge of operation, succeeding the late Lewis S. Streng. Mr. Lee has been general superintendent of the company.

E. D. Woods, who has been general electric operating engineer, succeeds Mr. Lee as general superintendent.

J. J. McKenna, vice-president and treasurer, was appointed to the executive committee of both the Louisville Gas and Electric Co. of Delaware and the Louisville Gas and Electric Co. of Kentucky, to fill the vacancy caused by the death of Mr. Streng. Robert Montgomery, vice-president in charge of sales, was elected to fill the vacancy on the board of directors of the Delaware corporation and Mr. Lee was elected to fill the vacancy on the board of directors of the Kentucky corporation.

Mr. Lee will observe his 25th anniversary with the Louisville Gas and Electric Co. on March 7, 1932. He graduated in 1906 with a B.S. degree from Rose Polytechnic Institute and became associated with the Louisville company in 1907 as construction inspector; in 1914 he was made head of the inspection and drafting department and later was appointed assistant general superintendent. In 1926 he was made general superintendent.

Nashville Gas & Heating Co. Gets Approval for Change-Over

Nashville Gas & Heating Co., Nashville Tenn., has received approval from the State Railroad Commission of its application to serve mixed natural and manufactured gas in Nashville. Supply will come from a line to get under way immediately from Kentucky fields, work to be done by Missouri-Kansas Pipe Line Co., Kansas City, Mo.

Nashville Gas & Heating Co. is a subsidiary of United Gas Improvement Co., Philadelphia, Pa. and is now distributing manufactured gas. There are approximately 15,000 meters on the system.

San Antonio Public Service Co. Appeals Injunction Suit

An injunction restraining the San Antonio Public Service Co. of San Antonio, Texas, from selling gas and electric appliances was issued in Austin, Texas, January 21 by District Judge Charles Wheeler. The company gave notice of an appeal from the decision.

Suit was brought by James V. Allred, attorney general of Texas, the State contending that sale of appliances is not authorized by Texas laws governing utility companies.

The judge declined to forfeit the company's charter, as the State had asked, or to assess a fine.

Oklahoma Natural's Heating School

By THOS. G. STOREY

Househeating Engineer, Oklahoma Natural Gas Corporation

BELIEVING that the company could bring about closer cooperation with dealers in gas appliances and various allied trades, Oklahoma Natural Gas Corp. organized in Tulsa a "Heating School," although not confining the subject matter strictly to heating. To this school were invited architects, contractors, builders and heating firms who are primarily interested in the construction and heating of homes wherein central plants are used for heating, also dealers in the smaller heating appliances, employees of the company and all others interested in this class of work. The response was gratifying.

It will be noted that practically all of the above classifications should be allied in the matter of giving the public the best that can be had in gas appliances and heating, and seeing that gas installations are properly made.

This school is being conducted by the writer and a meeting is held once a week in the evening with each session limited to a period of one and one-half hours. The first meeting was given to an outline of the plans, purposes and aims to be accomplished by the meetings. Time of meeting, length of sessions and the evening of the week most of those desiring to come could be in attendance, were also matters for discussion at the first meeting.

The subject matter has been handled in a lecture form until recently when more discussion has been permitted at each session. This procedure was followed for the purpose of getting those in attendance better acquainted before any lengthy discussions were allowed. Questions have always been permitted.

The program was developed in a slightly different manner than ordinarily would be the case, as the heating season was under way when the school was started. This necessitated a development from the practical side first rather than the theoretical.

Tulsa is probably 85 per cent heated with warm air or space heating, so heating with warm air was taken up first, followed with sessions on hot water and steam. Sessions have been and will be devoted to such subjects as the B.t.u. method of calculating heat loss; the warm air method of heating; heating by means of open space heaters, floor furnaces and circulators and with hot water and steam systems; an extensive discussion on the application of the Standard Code for warm air heating; the degree day and its application; automatic control equipment; insulation material; the A.G.A. testing laboratory and what its Blue Star Seal of approval means; combustion; chimneys and flues; forced air system of heating; air conditioning; proper installation of appliances and their adjustment; and there will no doubt be other subjects come up for discussion.

Captain A. E. Higgins of the A.G.A. addressed the class at one session, and at another meeting a representative of a control equipment company spoke.

As this plan has developed it has been found that discussions on various problems as brought in by those in attendance have been very beneficial. Through such meetings as these it is possible for the heating contractors to give the architects and building contractors a better idea of just what they must have in the way of construction to give the home owner the best class of heating service. This is all making for close cooperation and an understanding of the other fellow's problems that can be obtained in no other manner. In time it should give the company a unity of action that should produce real results in satisfied customers, better public relations and increased load.

At the last session before the scheduled Christmas Holidays, a vote was taken on whether or not to discontinue meetings until after the holidays. It was unanimously decided to continue, showing the interest of those in attendance in a school of this character.

To Conduct Activities of Pipe Protection Institute

The Underground Pipe Protection Institute has retained John B. McEwen, of 30 North LaSalle Street, Chicago, to conduct the activities of the Institute. Mr. McEwen has had no previous connection with the industry or affiliated branches.

Several years ago the Bureau of Standards and the Corrosion Committee of the American Petroleum Institute advanced the thought that it would be more advantageous to communicate with an organization of manufacturers of protective coating than with the same manufacturers as individuals. To this end, the Underground Pipe Protection Institute was organized.

Up to the present time the Institute has functioned as the medium for exchange of information between the American Petroleum Institute, the American Gas Association, and the Bureau of Standards, also Institute members. The Institute also prepared a tentative code for visual inspection of coatings and submitted the same to the Bureau of Standards for further action by the several organizations mentioned above.

After feeling its way for the last year or so, the Institute believes it is now in a position to be of more substantial assistance to its members and to the trade as well.

A Co-ordinating Committee and Technical Committee have been appointed and are now functioning, and a campaign is being conducted to increase both the active and associate memberships.

Herbert S. Whiton Appointed as Chief Mech. Engr. for Byllesby

Announcement has been made by H. W. Fuller, vice-president in charge of engineering and construction, Byllesby Engineering and Management Corp., of the appointment of Herbert S. Whiton as chief mechanical engineer of the company. Mr. Whiton has been acting chief mechanical engineer since the retirement in March, 1930, of H. Boyd Brydon.

Mr. Whiton attended the public schools of Hingham, Mass., and received the degree of B. S. in mechanical engineering from Harvard University in 1901. He was associated with the Babcock and Wilcox Co. from 1901 to 1903, and in 1905 entered the employ of Stone and Webster. In 1909 he became associated with the Minneapolis General Electric Co., which position he held until June, 1923, when he became assistant chief mechanical engineer of Byllesby Engineering and Management Corp.

Mid-West Regional Sales Council to Meet February 16

DEVELOPMENTS in the Mid-West gas industry, with particular reference to sales policies and plans that have been set up for the current year will be the principal topics to be discussed at the 1932 Mid-West Regional Gas Sales Conference, sponsored by the Commercial Section of the American Gas Association, which will open a two-day session at the Hotel Sherman, Chicago, Ill., February 16.

F. M. Rosenkrans

To facilitate the attendance of combination company representatives at the minimum expenditure of time and money, the Mid-West Conference will be held on the two days prior to the Great Lakes Division meeting of the National Electric Light Association in Chicago, which will take place February 18 and 19. The attendance of A.G.A. manufacturers, it is expected, also will be facilitated because their regional conference will take place at Chicago, February 18 and 19.

Members of the Mid-West Regional Gas Sales Council are as follows: F. M. Rosenkrans, The Gas Service Co., Kansas City, Mo., chairman; Stanley Jenks, Northern Indiana Public Service Co., Hammond, Ind., vice-chairman; E. J. Boyer, Minneapolis Gas Light Co., Minneapolis, Minn.; A. F. Davey, Wisconsin Public Service Corp., Sheboygan, Wis.; Howard Davis, Commonwealth and Southern Corp., Jackson, Mich.; W. R. Evans, The Peoples Gas Light and Coke Co., Chicago, Ill.; D. H. Frazier, Jr., Battle Creek Gas Co., Battle Creek, Mich.; R. O. Jasperson, Milwaukee Gas Light Co., Milwaukee, Wis.; W. L. Jones, The St. Louis County Gas Co., Webster Groves, Mo.; G. C. Klopf, Wm. A. Baehr Organization, Chicago, Ill.; C. A. Luther, The Peoples Gas Light and Coke Co., Chicago, Ill.; W. F. Miller, Public Service Co. of Northern Illinois, Chicago, Ill.; C. A. Nash, The United Light and Power Co., Davenport, Iowa; C. V. Sorenson, Indiana Electric Corp., Indianapolis, Ind.; Ira Steele, Des Moines Gas Co., Des Moines, Iowa; R. J. Vandagriff, The Laclede Gas Light Co., St. Louis, Mo.; Paul Young, Central Public Service Corp., Chicago, Ill.

Johnson Appointed District Mgr. for Ozark Distributing Co.

Announcement is made of the appointment of Harold W. Johnson of Independence, Mo., as district manager for the Ozark Distributing Co. at Warrensburg, Mo. There are seven towns in addition to Warrensburg included in Mr. Johnson's territory: Knob Noster, LaMonte, Sweet Springs, Concordia, Emma, Alma and Blackburn. Mr. Johnson has been superintendent of the Jackson County Light Heat and Power Co. at Independence, Mo., since 1929 and prior to that time was superintendent of the Joplin Gas Co., Joplin, Mo.

H. K. Porter who has acted as manager since the opening of offices in Warrensburg last year, has been placed in charge of service for the district. Mr. Porter was in charge of the distribution systems for the district.

C. E. Arundel to Have Charge of Gas Refrigeration Sales

An intensive selling campaign for large gas refrigerator installations, concentrated on apartments, hotels and clubs, is to be made by the Industrial Engineering Department of the Southern Counties Gas Co., Los Angeles, during the present year, according to Charles L. Ferry, manager of the department. The campaign will be handled by C. E. Arundel, industrial sales engineer for the company.

The sales organization of 35 men in the company's eight districts will cooperate in the drive to equip large structures with complete gas refrigeration. The present plan of the sales campaign will create a close working arrangement between salesmen and Mr. Arundel, who will give expert assistance in closing multiple-unit contracts.

Mr. Arundel has for the past three years been associated with the company as heating engineer, first with the Santa Monica office and later with the general office in Los Angeles. His experience in the sale of large industrial gas equipment, including steam and power generating plants of various kinds, is expected to be of value in building up the company's gas refrigeration sales.

Previous to becoming associated with the Southern Counties Gas Co. Mr. Arundel for three years was heating engineer with the Birmingham Electric Co. of Birmingham, Ala.

Builders Service Dept. Established by Seattle Gas Co.

A NEW special service department has been established recently by the Seattle Gas Co. under the direction of H. H. Whiteside. Assisting Mr. Whiteside are A. E. Finlay, W. E. Smith and Leighton Steele.

Mr. Whiteside assumes supervision of the new work following years of experience in the manufactured and natural gas industries. Just prior to this appointment he has been a member of the household heating department at the Seattle Gas Co.

H. H. Whiteside

He learned the gas industry first from his father, a pioneer in natural gas fields in Kansas and Arkansas. Following his early training, his activity has been varied. For seven years he was sales manager of the Tacoma Gas Co., Tacoma, Wash. Another year was spent as manager of the Olympia office.

Later, he returned to the earlier fields of his experience in the states of Kansas, Arkansas and Oklahoma. He conducted a special gas field investigation in Kansas.

Another Move to Serve Regina, Sask., With Natural Gas

It is reported that independent operators in Turner Valley, Alberta, led by Herbert Greenfield, are negotiating with the City of Regina, Sask., to supply natural gas to the city through a transmission line from Turner Valley gas field.

Line Ready to Serve Dickinson

Construction is reported nearly completed on the line to serve Dickinson, Texas, from the Texas City-Galveston line of the Houston Pipe Line Co., Houston, Texas.

Practical Discussion of Appliance Servicing

(Continued from Page 27)

Gas used at insufficient rate.
Burned out bottom.
Warped oven bottom.
Restricted vent passages.
Improper size orifice in valve.
Warped and dirty burners.
Back firing.

2. Baking browns on bottom but not on top. caused by:
   Strong draft (damper).
   Draft, flame and oven bottom good.
   Oven linings and sides warped or clogged.
3. Oven burns on bottom and browns on top. Caused by:
   Poor draft.
   Oven bottom burned out.
4. Browns on top but not on bottom. May be caused by an air-bound oven bottom.
5. Baking that burns on edges. Caused by:
   Oven racks in line with openings in lining for circulation.
   If oven bottom is baffle type, may be caused by using pans wider than baffle bottom.
   May be caused by crowding oven pans too close to lining.
6. Baking burns in spots on bottom. Caused by:
   Placing baking over openings in oven bottom.
   Oven bottom warped.
   Burner warped.
7. Heat control not satisfactory. Caused by:
   Backfiring when control shuts off.
   Pressure low (out of range for regulator).

Sometimes it will become necessary to analyze the flue gases to get a complete history.

Assuming now that the oven has been satisfactorily adjusted and heat control properly set, we may direct our attention to the range top burners.

The small burner should be adjusted to burn 9,690 B.t.u. per hour on the open type and the giant burner to 15,960 B.t.u. per hour.

These burners are the approved star burner on all of the later type ranges. However, we may encounter some ring burners or closed head burners which are somewhat troublesome due to the difficulty of obtaining sufficient secondary air.

The burner consists roughly of a gas cock and orifice air shutter, throat or venturi, mixing tube, burner body and ports. The conditions of poor combustion, their causes and remedies are similar to the conditions encountered with oven burners, but as a general rule are not as difficult to correct.

Things to observe (conditions, causes, remedy):

1. Poor combustion:
   (a) Due to poor pressure.
   (b) Due to improper adjustment. Adjust air shutter to give sharp blue cone.
   (c) Orifice not properly centered.
2. Burners whistle:
   (a) Too much primary air (adjust shutter)
   (b) Burr in orifice, or orifice irregular in shape. Ream carefully.
3. Burners Backfire:
   (a) Lean air-gas mixture (Reduce primary air).
   (b) Poor pressure.
4. Yellow Smoky Flame:
   (a) Too much gas in mixture. Open air shutter to give sharp blue cone.
5. Leaks.
   (a) Valves, fittings, unions and pilots. If in valve, remove core. See that port is free from grease or restriction. Clean core thoroughly and grease sparingly with a good cock grease. Do not try to stop valve leak simply by adjusting spring tension at bottom. Replace valve if necessary.
6. To clean burners, brush, boil in solution of soda—ream ports gently. Regulate to firm blue violet flame, the tips just touching the vessel.

Generally speaking, if we have good workable knowledge of the characteristics of combustion of the fuels with which we are dealing, our problems will be much easier.

Such a knowledge will work wonders in consumer relationships, do much to establish a new confidence, and develop your own interest in your job.

Death of A. J. Peters, A. G. A. Section Chairman, Announced

A. J. Peters, general sales manager of the Consolidated Gas Co., of New York, and Chairman of the Industrial Gas Section of the American Gas Association, died suddenly at his home in Flushing, Long Island, on Christmas Day, at the age of 40.

Mr. Peters was born in Philadelphia, Pa., in 1891. He entered the employ of the Consolidated Gas Co. in 1920 as ledger clerk. In 1922 he was made commercial manager of the New York and Queens Gas Co., and in 1925 he was appointed assistant manager of the Consolidated Gas Co.'s general office appliance division. In February, 1926, he was made manager of the industrial division of the company, and in September, 1927, he assumed the duties of assistant general sales manager. Early in 1930 he was made general sales manager. Mr. Peters was an active member of the American Gas Association, having served on committees of the Industrial Gas and Commercial Sections. He was elected chairman of the Industrial Section at the 1931 convention.

To Construct Line to Towns in Winnebago County

Central Public Service Co., headquartered in Chicago, Ill., is reported to be planning a transmission line from its manufactured gas plant in Rockford to serve towns in Winnebago county, Ill. The system would probably be changed over to natural on completion of the Geneseo-Milwaukee extension from the Texas-Chicago carrier of the Natural Gas Pipe Line Co. of America, Chicago.

To Serve Three Minn. Towns

Seven miles of natural gas lateral pipe line is under construction to serve Dodge Center, Kasson, New Richland and Wells, all in Minnesota. Northern Gas and Pipe Line Co., Omaha, Neb., is constructing the extension.

MEASUREMENT and CONTROL

Factors That Affect the Test of Meters

By JOHN E. NAYLOR

The Peoples Gas, Light & Coke Company, Chicago, Illinois.

THE 1929 sub-committee on meters of the American Gas Association recommended that meters be checked proof tested at a rate of flow equivalent to 20 per cent of the meters' rated capacity and what was formerly the open pipe test be made at a rate of flow equal to the rated capacity of the meter. This recommendation has been adopted in The Peoples Gas, Light and Coke Co's. Meter Shop. All meters are now tested and checked by using the proper orifice in the meter outlet. Each prover is equipped with a set of orifices. Two orifices are used for each type of meter, a check orifice calibrated to 20 per cent of the meter's rated capacity and a second orifice which is drilled to pass a volume equal to the meter's capacity. Ten-light meters are also tested on the 5-foot provers. The prover bypass is used for the 10-light check test and a drilled sleeve capable of passing 250 feet per hour is used in the outlet for 10-B capacity test. As the outlet connection will pass 300 cubic feet per hour when the sleeve is removed, this is used for the 10-300 capacity test.

All 5-foot prover hose connections had to be replaced by larger hose to take care of the 10-300 capacity test.

The large meters tested on the 20- and 200-foot provers are provided for by tin discs that are drilled to the proper size. The volume the orifice will pass is stamped on each disc as well as the size of the meter for which the orifice is to be used.

Using the orifice in proof testing meters means primarily that all meters are tested uniformly and that the test at capacity will have a standing that the old open column test did not have, as the meters were working way over capacity.

The paper "Testing Large Gas Meters" read last year at the Tenth Gas Meter Short Course demonstrated the effect on the capacity proof when large meters are adjusted on small provers or tested at rates of flow appreciably less than the meters' rated capacity. This brought out the fact that if the check adjustment is fast and the adjustment made below capacity is slower the meter proof will become slower as the rate per hour increases. Again if the check adjustment is slow and the adjustment made below capacity is faster the proof will become progressively faster as the rate of flow increases.

The solid lines of Fig. 1 represent these statements.

A 60-B meter was adjusted at the proper check and open rates. The check was then adjusted to 98 at 200 cubic feet per hour and changed successively ½ per cent slower from 98 to 102 while the open test at 600 cubic feet per hour was held at 100. The meter was tested at each adjustment at rates of 200 to 1250 cubic feet per hour.

Now in place of the adjustment made at the rate of 600 cubic feet per hour, suppose it had been made at the rate of 1000 cubic feet per hour as shown by the broken lines. The effect would be to bring the point of intersection closer to the meters' rated capacity and so restrict the error at capacity. If the prover is large enough to give a flow equal to the meters' rated capacity so much the better, as it is an easier matter to make the check and capacity adjustments to less than ½ of one per cent and be positive of the adjustment. If large meters are adjusted on small provers it is very difficult to hold the check and so-called capacity proofs absolutely together and be sure that the two are together.

It is not necessary to purchase large provers to get increased rates of flow, as this can be obtained by enlarging the dry well and prover connections.

In some locations it is the practice to set a meter with a capacity somewhat smaller than the hourly demand of the consumer. While this practice is not condemned it might be harmful to the meter, causing excess wear and strain which will result in a slow meter.

It is considered much better practice to set two smaller meters that will have a combined capacity equal to the demand of the appliances which are to be served. Using a battery of two meters assures continuous service, because if one meter breaks down the other meter will carry part of the load and give the customer gas until the defective meter can be changed. The meters in a battery should be set with a cock at the inlet and outlet of each meter so that a meter can be changed without interruption of service.

The conditions of temperature and humidity immediately surrounding a meter set have much to do with the meter proof as well as with the life of the meter. Meters set in damp locations tend to rust out in a short time, while those set in a hot and dry location tend to bleached diaphragms and fast meters. A temperate dry location free from drafts is the most desirable. Meters set in rooms where the temperature is lower than the ground temperature are very apt to have condensates form in them.

Throughout the repair operations there are numerous tests that must be made to insure that faulty mechanism will not interfere with proof tests. A most particular one which has not received the attention and study to which it is entitled is the packing of boxes.

In the past it has been the practice to pack all boxes very tight. The idea was that the tighter the box was packed the less chance for the gas to leak through. Under this method of packing the cap would just catch the first thread and was then screwed down as far as it would go. As a result the greased yarn was subjected to a heavy pressure which forced a large percentage of its grease out. The grease was forced through the flag rod hole in cap and bottom of the box and lost to the yarn. After the meter was in service for a short period of time the yarn loosened up and the meter proof changed.

Since the packing of boxes appeared to be a matter of judgment with each individual repairman it was apparent that no uniform packing was possible under this practice.

As a result of this condition it was decided to pack the boxes loosely with the greased yarn and then to pour warm graphite grease into the box to fill it. The boxes are then tested for correct packing by raising the flag rod and letting it fall back into position of its own weight.

This method of packing appears to answer very well as there is no noticeable difference in the number of packing box leaks when the meter is tested or body gassed with 40 inches of water pressure, nor is there any noticeable increase in the number of leaks found by the top gassers. We are satisfied with this method of packing and believe that it eliminates many binds and helps in maintaining the proof of the meter.

*Presented at the Eleventh Gas Meter School and Conference, Iowa State College, Ames, Iowa, December, 1931.

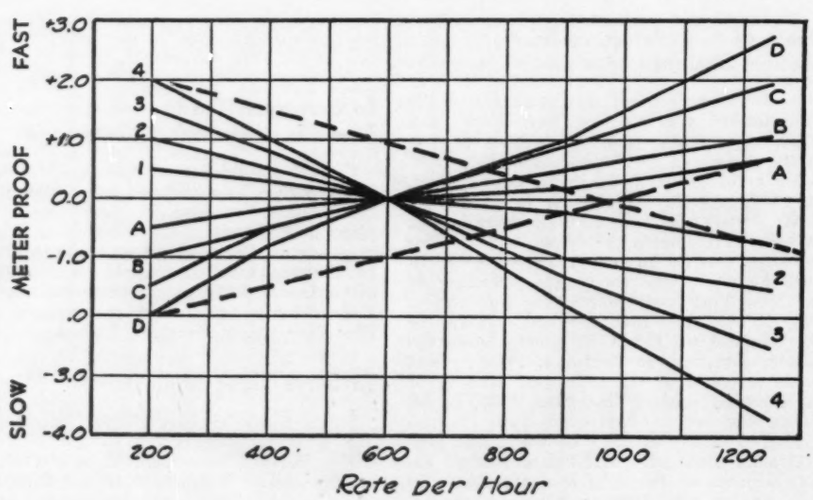


Fig. 1.

Pilot Control

By H. S. Harris

Assistant Engineer
*Los Angeles Gas and Electric Corporation**

ONLY last year the Pacific Coast Gas Association Regulator Committee, of which the writer was chairman, wrote as follows, as an opening paragraph relative to pilot control:

"The most common practice of maintaining pressure on a governor is to apply dead weight, either directly or through leverage, to the diaphragm stem."

H. S. Harris

In this short period of time it seems that the verb of that sentence has been changed from "is" to "was," for all the recent conversation relative to regulation centers around pilot and remote control.

In presenting this paper, it is not my intention to convey that pilot control is the better method of applying force to the diaphragm stem. On paper no doubt it is superior; but, with intermediate high pressures between 3 and 10 pounds per square inch, as predominating pressures in the Los Angeles Gas and Electric Corp. distribution system and with no desire to compound the regulator delivery pressure except as may be done by the use of an extended back pressure line (commonly called the static line), or by the velocity of the gas passing the back pressure line take-off, the pilot regulator would be of no value except to relieve diaphragm strain, and the writer does not feel that this is sufficient advantage to offset the few disadvantages associated with pilot control. Two of the most important disadvantages of pilot control are, (1) increased difficulty in diagnosing trouble, and (2) the necessity of bleeding gas to atmosphere.

It is not intended to speak of pilot control in detail, for it is felt that the basic principles have been fully covered in the report as published in the August, 1931, issue of *Western Gas,* a copy of which all members of the Southern California Meter Association have received. This paper will deal mostly with illustrating the value of the pilot type of control, its adaptability to various uses, and some of the latest applications.

Simple Pilot Control

Let us assume an industrial line, supplied through a weight-loaded governor, is delivering 100 pounds gas pressure, and has a high side pressure varying from 125 to 225 pounds. Safe practice requires a 4-inch diaphragm for this governor. With a gas volume sufficient to open the governor valves to about three-quarters of their travel, it has been the writer's experience that the resulting down-stream pressure fluctuation would be nearly 15 pounds per square inch (exclusive of lock-up pressure), using a lever-and-weight balanced valve governor. The greatest influence responsible for this large variation is the rapid change in effective area of the small diaphragm. To offset this variation, pilot control may be used with a 9-inch or 11-inch diaphragm, and the down-stream pressure could be kept well within the limits of 5 pounds variation.

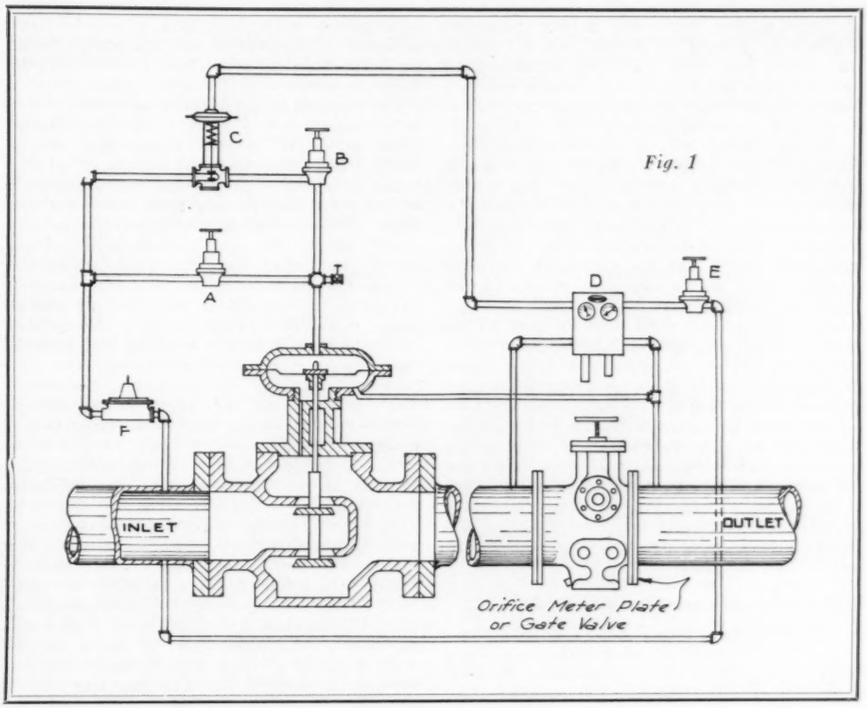


Fig. 1

The use of oversize diaphragms with simple pilot control is, however, a very dangerous practice without an absolute guarantee that the down-stream side of the main governor will not be shut down entirely; for, if this condition happens, rupture of the diaphragm may occur. If such cannot be guaranteed, this type of control may be accomplished with two pilots, one of which is of double diaphragm type. Again, assume the above problem of delivering 100 pounds per square inch pressure: If we use the double diaphragm type of pilot with a constant pressure of 10 to 15 pounds per square inch, maintained by an additional pilot ahead of it, and then have the 100 pounds down-stream pressure working under the auxiliary diaphragm and opposing the equivalent 100 pounds spring pressure of the pilot—it is possible to maintain the 100 pounds delivery pressure with only the lower pressure on the diaphragm. In this case it is necessary to have spring pressure on the main governor valves tending to force them to a closed position. Also, care must be taken to exclude the down-stream pressure from the main diaphragm.

The auxiliary type of pilot, as referred to in the next paragraph is only satisfactory up to approximately 125 pounds delivery pressure. However, there is at least one regulator manufacturer making a pilot control governor in one integral part using a similar method as just described to accurately maintain pressures as high as 500 pounds. One of the Coast gas companies has one of this type operating within very narrow limits around 400 pounds delivery pressure.

Simple Pilot Control with Extended Back Pressure Line

Assume a governor feeding 2 pounds per square inch pressure with inlet pressures varying from 10 pounds to 80 pounds. Even with the standard method of pilot control, the delivery pressure fluctuation would be close to 100 per cent, due to the effect of the varying high pressure on the pilot. This difficulty could be overcome by the addition of a second pilot ahead of the controlling one, thus keeping a fairly constant inlet pressure on the controlling regulator. A somewhat cheaper, neater, and more effective method, particularly if it is desired to overcome the pipe and pipe-bend friction losses to a point downstream from the main governor, is to use a double diaphragm pilot, as shown on Page 133, August, 1931, issue of *Western Gas,* Figs. 1 and 3. Any fluctuation on the pilot regulator, due to varying high side pressure, is ineffective, as that pressure acts in opposite directions against diaphragms of equal area, one tending to open the pilot, the other to close it.

The actuating pressure is that at the outlet of the governor, or the point where the back pressure line ties in, opposing the spring of the pilot through pressure exerted on the second, or auxiliary, diaphragm.

Back Pressure Control in Combination with Simple Pilot Control

It is desired to put excess gas fom a transmission line into a high pressure holder. The line pressure varies from 50 to 300 pounds per square inch; the maximum holder pressure is 75 pounds. The transmission line shall be considered to contain excess gas when its pressure is over 100 pounds.

Accepted practice has been to install two governors in the connection between the main line and the holder, one a back pressure governor and the other the conventional type of pressure regulator. With the use of two pilots, one regulating the delivery pressure and the other a back pressure type to control the supply to the first, it is possible to meet the above condition with only one governor. The double diaphragm pilot is well adaptable to this condition, the set-up being shown on page 133, August, 1931, issue of *Western Gas,* Fig. 5. The method of operation would be as follows:

With the pressure pilot set at 70 pounds, the governor would have a tendency to sup-

* Presented before the Southern California Meter Association, January 21, 1931.

ply the holder until the holder pressure reached 75 pounds, at which time it would shut off. The back pressure double diaphragm pilot is inserted as a branch connection to the low side of the pressure pilot, and is set at 100 pounds pressure. It is actuated from the under side of the auxiliary diaphragm. All pressures above 100 pounds will keep the back pressure pilot closed, and the pressure pilot will continue to feed 75 pounds to the top of the main governor diaphragm. Should the transmission line pressure drop below 100, the spring of the back pressure pilot would overcome the force exerted on the auxiliary diaphragm, thus allowing the back pressure pilot to open. This pilot, having a larger orifice than the pressure pilot, will allow the gas to bleed faster to atmosphere than it can be supplied by the pressure pilot, thereby reducing the pressure on the main governor diaphragm so that the governor will be closed off by the downstream gas pressure. In such cases care must be taken that the main governor diaphragm is of proper design, for the impracticability of designing pilot orifices to exactly meet the demand will leave an unbalanced pressure across this diaphragm.

Differential Pressure Boosting with Pilot Control

It is an accepted fact that leakage in a gas main system is a direct proportion to some function of the pressure. It is desirable, therefore, to maintain minimum pressure on a gas system during periods of low flow, but the pressure must be sufficiently high to satisfy the demand duing peak hours. To accomplish this purpose, pilot control, using a differential valve (Fig. 1) is very useful. The most satisfactory type of pilot for this set-up is the double diaphragm; but, for purposes of explanation, the single diaphragm pilot is less complicated. The only difference between the use of the two types is that the double diaphragm is actuated from the extended static line.

Pilot "A" is the main control pilot, and is set to deliver a minimum gas pressure duing the off-peak hours. Pilot "B" is the booster pilot, and is set to deliver the maximum desired gas pressure for the peak load. "C" is an ordinary diaphragm motor valve actuated by differential control valve, "D." This control valve is in turn, actuated by the differential pressure across the orifice meter or other type of restriction inserted in the line. A gate valve is entirely satisfactory.

The purpose of the differential control valve is to cut in and out the pressure delivered from pilot "E" to the diaphragm of the motor valve, also to bleed out the pilot line when it is shut off. When the differential across the orifice is less than a set amount, pilot "E" is delivering sufficient pressure to motor valve, "C", so that it will remain closed; but, when the differential exceeds the predetermined amount, the pilot line between "E" and "C" is closed and bled to atmosphere, thus allowing the spring to open valve "C" which, in turn, allows pilot "B" to boost the pressure on the main governor. The purpose of pilot "F" is to maintain constant inlet pressure on the other pilots, and is necessary only if the high line pressures are quite variable.

The possible difficulty of this arrangement is that, if the load comes on too suddenly, the stack in the line may be insufficient to hold up the system until the increased pressure becomes effective. Substitution of the differential control and motor valve shut-off could be a solenoid valve in place of valve "C." This arrangement should be quite successful if the time and duration of peak hours is known. A combination of the design in Fig. 1, plus a pilot electrically controlled through a solenoid valve, might also offer a solution for stacking the line.

Additional Uses for Pilot Control

Thermostatic control of a pilot operated valve is not uncommon in controlling steam pressue or flow of gas to the boilers. Pilot operation in conjunction with sensitive differential controllers has been very successfully used for cutting in additional orifice meter sets, and may also be used for opening by-pass lines. At pressure and holder stations, pilot control has proved to be a great labor-saving device, besides allowing the operator to remain at the control board while making pressure changes on the governors.

Where judiciously used, pilot control is a money-saving proposition; but it is felt that it should not be used indiscriminately where spring- or weight-loaded governors are entirely satisfactory.

Monthly Dinner and Business Session

MEETING again at Los Angeles Gas and Electric Corp. Ramirez Street plant, the Southern California Meter Association held its monthly dinner and business session on January 28, with two papers and a "question and answer" discussion as the features of the evening.

H. S. Harris of the Los Angeles Gas and Electric Corp. spoke on "Pilot Controlled Regulators." His paper, which appears in this issue, generated a great deal of discussion, with a general exchange of experience in regulation of gas and other fluids.

"Orifice Plates for Definite Base Coefficients" was the subject of a paper from M. W. Adcock of the Union Oil Co. This paper was a contribution from the Association's Standards Committee, of which Mr. Adcock is chairman and dealt with a departure from conventional orifice plate standards. It will appear in *Western Gas* for March.

R. F. Angell led a discussion for the "question and answer" committee of the S.C.M.A., a number of practical problems being introduced by members.

President P. W. Hill announced the annual S.C.M.A. Hi-Jinks date as Saturday, March 19. An energetic group headed by E. Lorenz, chairman of the entertainment committee, has arrangements for the Hi-Jinks in hand, and later announcement of details may be expected in February.

Omaha Packers Succeed in Getting Natural for Their Plants

Metropolitan Utilities District, Omaha, Neb. has granted several meat packing companies of that city permission to bring in natural gas for manufacturing purposes. Northern Gas and Pipe Line Co. Omaha, will deliver the gas from its major line to the city gate, at which point it will be measured. The packing companies will construct a distribution line from the measuring station to their several plants, and have posted a $50,000 bond to insure performance of their contract.

Reconditioning Cisco System

Community Natural Gas Co., headquartered at Dallas, Texas, has begun reconditioning operations on its distribution system in Cisco, Texas.

S. C. M. A.
Forum of Experience

"Knowledge is built upon the experience of others."

READERS of the "Measurement and Control" department of *Western Gas* are urged to take advantage of the service available through this "question and answer" column, which is conducted by the "Q. and A." committee of the Southern California Meter Association. This committee, of which H. E. Thompson, Los Angeles, is chairman, is a clearing house for new questions on measurement problems, and for answers to questions already published. Send new questions or your answers to the questions which appear below, to S.C.M.A. "Q. and A." Committee, Box 1100, Station C, Los Angeles, Calif.

This Month's Questions

Q. 117. How often should orifice plates be inspected? A. C. P.

Q. 118. In our gas quantity computations we must have the absolute pressure. Why do we not measure the absolute pressure instead of the gauge pressure plus atmospheric? Would it be practical to make an absolute pressure gauge? E. S.

Q. 119. Can throttling a valve cause an error in a reading of water column? P. T. H.

Q. 120. How can mercury that is broken up into globules, or is emulsified into a slate-colored paste due to admixture of oil, be recovered. R. C. A. (Ed. Note: We do not recollect instructions as to this phase of mercury reclaiming ever before appearing in Meter Association discussions.)

Previous Questions Answered

A. 113. Until recently monel was generally accepted as the best metal for orifice plates in gas service due to its certainty of noncorrosion. But the advent of chromium steels (sometimes called stainless steels) has somewhat changed opinions. The chromium steels are just as resistant to corrosion, are cheaper, are harder and are more easily machined. A safe, yet economical practice requires a thickness for plate of 1 per cent of the pipe diameter for service with a maximum differential of under 50 inches and a 50 per cent greater thickness for differentials of over 50 inches; plus a small allowance to obtain nominal gauges or thicknesses. Thus, for 2-inch pipe use No. 20 gauge or No. 18 gauge; for 4-inch pipe use No. 18 gauge or 1/16-inch; for 12-inch pipe use 1/8-inch or 3/16-inch; for 18-inch pipe use 3/16-inch or 1/4-inch; and for 24-inch pipe use 1/4-inch or 3/8-inch. (Ed. Note: It has been called to our attention that a more general practice is to use the same thickness for many pipe sizes. This, of course, is not economical engineering practice.)

A. 114. The extraction of the square root of "h×P" may be avoided if the static pressure is so regulated as to always be the numerical equal of the differential. In this

case as h = P, the radical appears as $\sqrt{h^2}$ or $\sqrt{P^2}$ which is equal to h or P and thus disappears from the calculation. Within certain limits another method may be employed: If h and P are within a few per cent of the same numerical value, they may be merely added and the sum divided by two, with a resulting per cent error that is half as great as their per cent difference. Thus:

$$\sqrt{h+(P=\pm 2\%h)} = \left[(h+P)\div 2\right] \pm 1\%.$$

(Ed. Note: This might be very useful under the special condition mentioned as, if 50-inch meter with 50-pound pressure spring were operated with a 50-inch x 50-pound chart and the pressure pen set up 14.7 pounds, the extension could be read directly from the chart within 1 per cent of accuracy as the middle point between the two pen lines, whenever these are within 2 per cent of coincidence.)

A. 115. Straightening vanes do a great deal of good if the gas is revolving as it approaches the orifice. The reason for this lies in the fact that, (in a general sense) gas is measured as the product of the area at the *vena contracta* and the velocity at this point. Revolving gas causes centrifugal forces within the *vena contracta* which increase its diameter to an amount greater than our tabulated orifice constants pressure—thus passing more gas than our calculations indicate.

A. 116. An answer submitted to this query by W. R. A. points out that "one 4-inch pipe will pass more gas or liquid than four 2-inch pipes. While their areas figure practically the same, a quantity of small pipes having the same area as one larger pipe, have much more rubbing surface, which causes friction and retards the flow. Such data may be found quickly by calculation or referring to tables for equalization of pipe areas." (Ed. Note: W. R. A.'s answer covers the case accurately where the pipes are exactly 4-inch and exactly 2-inch. It is interesting to note, however, that if the pipes are nominally 2-inch (2.067-inch actual) and nominally 4-inch (4.026-inch actual) the four 2-inch pipes have 5.44 per cent more cross sectional area and will pass more gas at low velocities—when the "skin friction" is of little consequence—but at very high velocities they will pass the same, or less, depending upon velocity, smoothness of surface, and viscosity of the gas.

S.C.M.A. Proceedings For 1930-31 Available

COPIES of the Southern California Meter Association Proceedings covering the last fiscal year have been distributed to the membership, and a limited number are available for general sale. The S. C. M. A. Proceedings covers papers and discussions presented before the organization during the 12 monthly meetings of the 1930-1931 Association year, and incorporates much valuable information on current problems of measurement and control. Some of the topics treated in the papers are as follows: Gasoline plant metering, field service and maintenance of orifice meters, pulsation in flowing gases, the meterman's equipment, alignment charts, correcting for temperature in large volume positive displacement meter measurement, gas flow temperature through orifice meters, measurement of fluid pressures, measuring non-viscous liquids by orifice meter, functions of rate and ratio controllers, classification of continuous flow gas and liquid meters, gas injection practice, accuracy expectancy in orifice meter measurement, design and operation of pressure regulators, large volume measurement stations.

Cost of the current Proceedings is $1.50, and orders may be placed by addressing the Southern California Meter Association at Box 1100, Station C, Los Angeles, Calif.

The Association also has available a few copies of the Proceedings for the 1928-1929 and 1929-1930 years, and all three numbers may be ordered for $2.50.

Lone Star Files Application for Injunction in Fort Worth Case

An amended application for an injunction to restrain the city of Fort Worth, Texas, from instituting proceedings for condemnation and eventual municipal operation of the Fort Worth gas distribution system, was filed by the Lone Star Gas Co., Dallas, on January 13 in Seventeenth District Court.

Judge Culver of that court on December 29 sustained a demurrer of city attorneys to the utility's original application stating that passing upon the petition would be, in effect, passing upon the merits of a lawsuit before it was filed, and that the application was not in his jurisdiction.

The new petition was filed by the company both in its proprietary capacity and in its capacity as a taxpayer, and attacks the constitutionality of a 1930 act of the State Legislature, under which the city would proceed in condemning the property.

Mettler Automatic Safety Pilot Switch is Announced

PILOT LIGHT
CHANGEABLE ORIFICE ANY KIND OF GAS
AUXILIARY PILOT AND ELEMENT HEATER
BIMETAL TWO OR MORE PIECES REVERSED FOR COMPENSATION.
OUTER SAFETY COVER
BUNSEN TUBE MIXER
SILVER ALLOY CONTACTS REQUIRING NO ADJUSTMENT
ELECTRIC TERMINALS
GAS SUPPLY

THE Lee B. Mettler Co., Los Angeles, Calif., manufacturer of gas burners, announces production of a new Mettler automatic safety pilot switch. When the pilot is ignited the circuit is closed within 30 seconds, and when the pilot is extinguished the circuit is broken within 30 seconds. The combustion chamber may heat to 1750° F. without affecting the action of the pilot switch. The new device has a changeable orifice, silver alloy contacts, and auxiliary pilot and element heater and a bunsen tube mixer, as shown in the accompanying illustration.

Oskaloosa Scheduled to Have Natural in January

Oskaloosa, Kan., expected to have gas during the middle of January through the mains of the Kansas Pipe Line & Gas Co. Other towns scheduled to receive gas later in the month were Ozawakie, McLouth, Meriden and Winchester. The town of Perry, Kan., expects to have service through the company's mains about the first of March.

Al Souleck Dies of Injuries Received in Motor Accident

Al Souleck, salesman for the Lancaster district of the Southern California Gas Co. of Los Angeles, died on January 22 from injuries received in an automobile accident on January 19.

Day Transferred to Erie; Tomlinson to Los Angeles

K. C. Tomlinson

HERBERT G. DAY, formerly manager of the Los Angeles plant for Pacific Meter Works, has been transferred to the Metric Metal Works at Erie, Pa. K. C. Tomlinson, assistant manager of Pacific Meter Works, who has been located at San Francisco, is now making headquarters in Los Angeles. This change was made due to the consolidation of the Westcott & Greis Pacific Coast office with Pacific Meter Works.

Mr. Tomlinson has been with Pacific Meter Works for six years, the past four years as assistant manager. He was formerly with the California Railroad Commission.

Service of "Natural" Begun in Rochester, Minn., Jan. 16

Northern Gas and Pipe Line Co., Omaha, Neb., reports completion of a natural gas transmission line from a point near Owatonna, Minn., to Rochester, Minn. Interstate Power Co., serving the city, has filed a new rate schedule on the therm basis following satisfactory completion of negotiations between that company and the Northern Natural interests.

Gas was turned on in the Franklin Institute, serving the Mayo Clinic and other industrial consumers, about the middle of January, and will be distributed for domestic use as soon as arrangements are completed by the Interstate Power Co.

Los Angeles Gas and Electric Corp. 1932 Expansion Program

Nearly $4,000,000 will be expended by Los Angeles Gas and Electric Corp., Los Angeles, Calif., during 1932 for betterments and additions to its gas and electric systems, according to the announcement of Addison B. Day, president and general manager of the utility company.

Among items on the 1932 betterment program, besides the recently announced Seal Beach hydro-electric project, are 10 miles of commercial gas mains, 8,000 gas services, 5,000 gas meters, and 3,600 gas regulators.

Newton Gas Co. Now Operating Under Franchise Granted Jan. 12

Newton Gas Co., Newton, Kan., was granted a franchise on January 12 to serve natural gas in Newton. The company is a subsidiary of Gas Service Co., Kansas City, and has been serving the town without a franchise. At a recent election a proposal to establish a municipal gas distribution system in the town was defeated.

BUTANE - PROPANE NEWS

Covering Liquefied Petroleum Gas Service

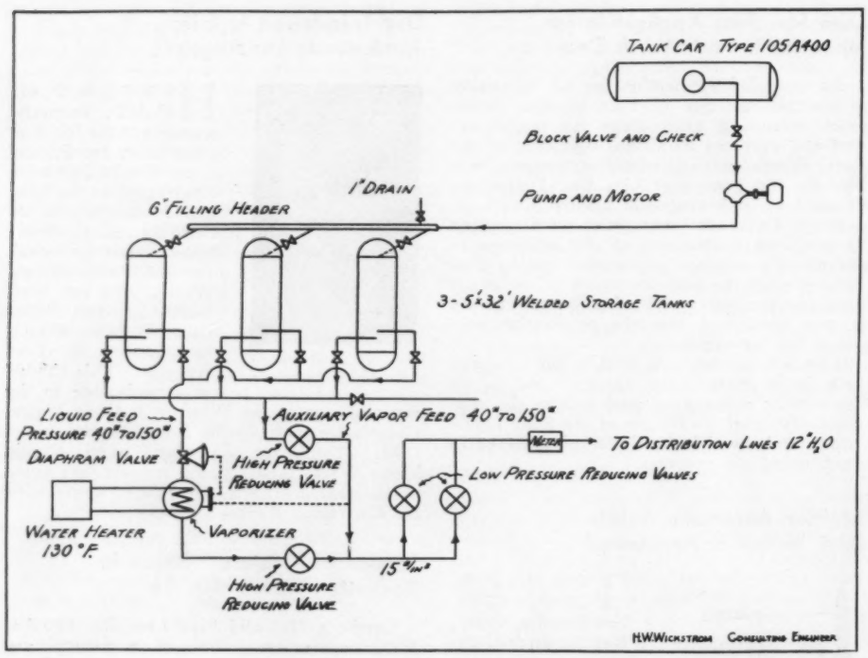


FIG. 1

Flow sheet—butane propane plant of the Nevada Gas Co. at Las Vegas. This system brings the first central plant liquid gas service to Nevada. An undiluted mixture of 29 per cent propane, 25 per cent isobutane, and 46 per cent normal butane being distributed.

Plant Design and Load Building for Undiluted Vapor Service at Las Vegas

By H. W. WICKSTROM

Consulting Engineer

ON September 26, 1931, the Nevada Gas Co. started serving gas to the people of Las Vegas, Nevada, inaugurating the first butane-propane plant in the State of Nevada. It will be the purpose of this article to describe briefly the construction features and salient points in load-building and operations at this property.

Las Vegas is a city having a population between 8,000 and 10,000 and located on the desert about 300 miles from Los Angeles, Calif. It is the second largest city in the State of Nevada and if its growth continues it will rival Reno for first honors. In the past it has depended largely on the Union Pacific Railroad as a division point and shop center for its support. However, with construction started on the Hoover Dam Las Vegas has come into its own. It is the natural gateway to this giant project, being only 31 miles from the dam site. Considerable substantial building is going on; all of the streets have been paved in the main townsite area; bonds have been voted and contracts let for the installation of a modern sewage disposal system. Unlike most desert towns there is an abundance of shade trees, mostly cottonwoods, that have now matured, helping to protect the older section of the town from the heat of the summer sun. All of these factors coupled with the liberal divorce and gambling laws, insure a steady development of the area.

The climate is typical of the desert. For three months in the summer the thermometer will stay close to 100 most of the time, with a pleasant spring and fall, and a winter season that is comfortably warm in the day time and comparatively cold at night. Freezing weather is not unusual.

To serve this city a plant and distribution system was designed to take care of 1,000 meters, which capacity can be increased materially by the installation of an additional storage tank and a fourth cross-town header.

The system is an undiluted butane-propane mix type serving gas of approximately 3,000 B.t.u. content. The following mix is used without variation throughout the year: 29 per cent propane, 25 per cent isobutane, 46 per cent normal butane. The plant shown in Fig. 1 consists of three 5x32-feet welded steel storage tanks, heat exchanger, primary and secondary pressure reducing valves, plant meter, and an automatic vapor stand-by system. The details of undiluted propane plants have been described fully in earlier issues of *Western Gas'* "Butane-Propane News" department, and this plant differs only in one respect which will be described.

Ordinarily the primary pressure reduction has been carried on in the liquid stage. Although this is usually satisfactory, in freezing weather unless the liquid is absolutely free from water there is a possibility of freezing in the reducing valves. In this plant the liquid goes directly from the tanks to the heat exchanger where vaporization is assured, and the pressure reduction is then made in two steps in the vapor stage, the first to approximately 15 pounds per square inch and the second to line pressure of 12 inches water.

H. W. Wickstrom

To protect the system from intrusion of liquid in case the heat exchanger fails to function, a level control is installed near the top, which will allow a spring operated valve in the liquid feed line to close until the liquid level recedes, when it will automatically open. This plant is entirely automatic, a service man visiting it once a day to change the recording charts and to make an inspection of all valves, tanks, etc.

The plant is located on the outskirts of the city adjacent to the Union Pacific tracks. Connections are available for unloading the liquefied petroleum gas from either tank cars or tank trucks. Up to the present time all shipments have been received by tank cars.

The densely built up section of the city is approximately one mile square. This is served from a 6-inch main from the plant, feeding into two 4-inch and one 3-inch cross-town headers. The headers feed into 2-inch distribution lines having a maximum run of 3,000 feet between headers. All lines are laid in unpaved alleys and bores were made under all street crossings.

Soil tests made before the installation of the system indicated high corrosive condi-

tions which were checked by the experience of the water company. Surface water is encountered in the southern side of the city at depths ranging from 18 inches to 3 feet. To retard deterioration from corrosion extra heavy steel pipe was installed which was treated with protective coating, wrapped, treated the second time and wrapped with paper for protection in handling. All service pipe, which is ¾-inch and 1-inch, was wrapped the same way. All joints including service connections were welded and the entire system tested out at 125 pounds to the square inch air pressure. The system was tested section by section, a portable air compressor supplying pressure, and a final 48-hour test made of the whole system when complete.

All meters installed were cast iron type and were set outside of the houses. The meters have conventional dials calibrated to read directly in cubic feet of 550 B.t.u. gas.

The following rate schedule is in effect:

Meter deposit $2.50 returnable at the end of one year, or upon discontinuance of service.
$2.00 1st 1000 cubic feet.
$1.75 per 1000 cu. ft. for 2nd and 3rd thousand.
$1.50 per 1000 cu. ft. for 4th, 5th and 6th thousand.
$1.25 per 1000 cu. ft. for 7th, 8th and 9th thousand.
$1.00 per 1000 cu. ft. for 10th thousand on.

A minimum monthly charge of $2.00 is made.

A commercial rate of 75c per thousand is offered to large users, with a minimum charge of $50.00 per month.

A preliminary survey of Las Vegas indicated very favorable competition. Bottled gas was being used extensively, there being 500 to 600 customers in the district. Rates on bottle gas were approximately 10c per pound. There is no cheap wood fuel available, as it all has to be shipped in. Coal sold for 90c per sack retail. Stove oil sold at 8c per gallon, kerosene at 25c per gallon, and electricity at 10c per KWH.

Shortly after construction work was started a local manager was appointed who spent his time contacting prospective customers.

Due to the fact that a coke gas plant built and operated in Las Vegas some years previous had given poor service and had eventually failed, and to the further fact that the city had been over filled with promoters of various projects that had never actually developed, very little encouragement was received in this type of sign-up campaign. Nothing was asked of the prospective customers excepting to sign an application for service, no deposit being required and no obligation being made on their part for the expenditure of any money. During the period of construction about 125 prospective customers were signed up. One week previous to starting up advertisements were run in both the morning and evening newspapers, announcing a definite starting date for gas service, and over 100 applications for service were received in that week. Whenever possible a service line was run from the mains to the house after an application had been signed, but no meters were set. When gas was turned into the system there were about 150 services laid and six meters set.

From September 26 to December 1 a total of 350 meters were set. During this period eight men were employed in construction work, laying services, setting meters and adjusting appliances. A considerable number of customer applications were received by the service crew while they were working installing services and meters.

A spirit of friendly competition was enjoyed with the bottled gas companies who defended their business very ably by reducing their prices in one instance, and by the use of clever salesmanship.

Although the rush of meter setting ended by December 1, there were 50 meters added to the system in December and installations are proceeding at about the same rate in January.

Due to the desert climate, with warm temperatures in the day time and cold at night, an unusually large heating load was developed. It is an ideal location for gas heating as usually all the heat that is required is for a short time in the morning and at night.

The average daily output during the month of December was well above 100,000 cubic feet per day, with a peak of 134,000 cubic feet. It is estimated that 50 per cent of this is heating load that will drop off to nothing by the middle of March. Some of this load will be compensated for by additional cooking load, as it is expected a large number of coal and oil cooking stoves will be displaced by gas when the hot weather sets in. There is also a high potential gas refrigeration load, both commercial and domestic.

Appliance sale was limited to stoves, water heaters and radiant-type and circulating heaters. A policy was adopted of handling only high quality merchandise, and despite competition with all lines of cheap equipment a satisfactory volume of business has been obtained in the appliance field. Immediately after the first cold snap the demand for both radiant-type and circulating heaters was good. Due to the fact that most of the houses are small and partitioned into small rooms the output of circulators was limited. A number of them, however, were placed in stores and clubs.

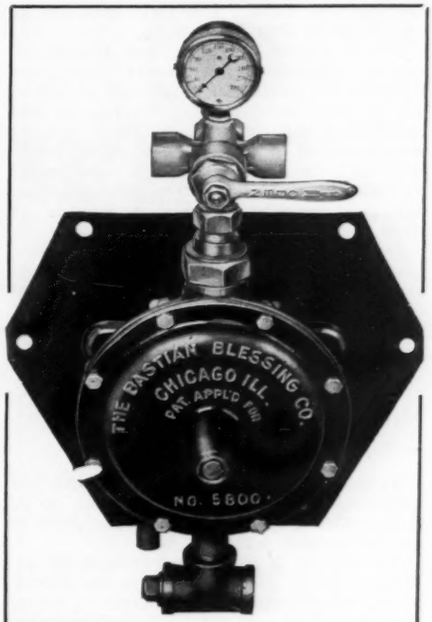
The policy of the Nevada Gas Co. since its start has been to establish amicable relations with its customers, endeavoring to satisfy as many as possible. No high pressure salesmanship has been employed in building up connections or loads, but the company has endeavored to build up a business on service. No charge is made for appliance or stove adjustments, with the exception of replacing parts such as burners and valves. No piping was done inside of houses, all of this work being taken care of by the local plumbers. When worn out and inefficient appliances were encountered they were adjusted as well as possible; the user was advised of their condition and the effect it would have on their gas bill. A pamphlet is enclosed with the first bill, giving information on the amount of gas used by different appliances. This pamphlet is entitled "Gas Facts that Everyone Should Know", and supplies the following data on consumption:

Operating at full capacity your appliance should use approximately the following amount of gas:

	Cu. Ft. Per Hour
Cooking Stove:	
Giant Burner	12.4
Regular Burner	9.9
Oven Burner	34.0
No. 25 Circulating Heater	48.0
6 Element Radiant Heater	50.0
5 Element Radiant Heater	42.0
4 Element Radiant Heater	27.0
3 Element Radiant Heater	15.0

The operating personnel consists of a local manager, a bookkeeper and two service men. The outside men take care of service and meter installations as well as stove adjustments, meter reading and repair.

The plant and distribution system were installed by the Lang Transportation Co. of



The *Original* Petroleum Gas Regulator

When the Liquefied Petroleum Gas industry was yet a pup, The Bastian-Blessing Company, sensing its possibilities, designed, engineered, fabricated and installed the original control equipment. Today's wide acceptance of these units proves that planned products have a definite place.

The Special Pressure Regulator illustrated is merely a refinement of the original, which we created for the then-beginning industry.

The Rego Pressure Regulator is fool-proof . . . it is easily and quickly installed . . . has a diaphragm and seat immune to gas-attacks . . . and controls pressures perfectly. Models available for "wet" or "dry" gas.

Separate Units—or a Complete Assembly of Manifold, Regulator, Seal, etc.

Factory-tested assemblies, packed in substantial re-shipping cartons, solve the problem of installing controls "out on the job." These assemblies comprise Manifold, all Cylinder Connections, Two-way throw-over valve, Regulator, Mercury Seal and a supply of mercury.

Vast data on merchandising and distribution available. Ask us any question.

The Bastian-Blessing Company
254 E. Ontario St.
Chicago, Ill.

Los Angeles, Calif. The local manager at Las Vegas is Dan Williamson.

The successful operation and absence of service complaints has proven the practicability of distributing undiluted petroleum gas in good sized towns. Previous to this installation most of the undiluted systems were installed in much smaller communities. Absolutely no trouble has been encountered by condensation in the system, although there has been freezing weather a number of times.

Several extensions to the system are planned to furnish gas to districts not served at this time. It is expected that the potential of 1000 meters will be secured within two years, which will make this installation one of the most interesting yet established.

Natural Gas Corp. of Calif. Completes El Centro Plant

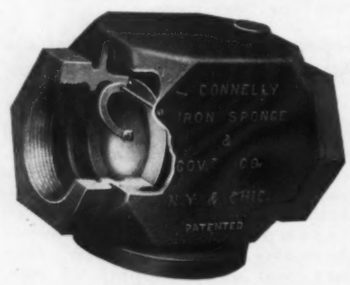
Natural Gas Corp. of California has just completed its new air-butane plant at El Centro, Calif., replacing the oil gas plant in use for several years.

The change to butane has necessitated adjustment of all gas appliances in the district. Flame temperature of the butane is lower than that of oil gas, the air butane temperature being 1600° F. compared to 1800° F. for the oil gas. In advance of the change over, a survey of appliances was completed and much experimental work carried on to determine the characteristics of the new fuel as compared to the oil gas.

At the present time there are more than 1600 meters connected with the El Centro butane plant, while in the summer about 1200 will be in operation, many of the residents moving from the Imperial Valley during the extremely hot season.

Connelly Iron Sponge & Governor Company

Automatic Balance District High or Low Pressure
Back Pressure Valves
Photometers Testers
Siphon Pressure Gauges
Telemetric Gauges
Street Dep't Requisites
Lockwood Safety Valves
Gas Works Equipment
Gas Screens
Gas Tape
Combination Valve
Caloroptic Calorimeter
Counter-Balance Man Hole Cover
Safety-Syphon Seal



BACK PRESSURE VALVE
½" TO 36"

Write for Bulletins

ELIZABETH NEW YORK
CHICAGO

AT RIGHT:

The display at Hartford, first prize winner in the contest sponsored by Shell Petroleum Corp. (Illustrations courtesy of the company.)

Prize Winners in County Fair Display

A "COUNTY FAIR" display contest sponsored by Shell Petroleum Corp., St. Louis, Mo., in the interest of marketing Shellane, the company's bottled gas, closed recently with the display at the Hartford County Fair, Hartford, Mich., winning the first prize of $25.

Three dealers cooperated in this booth, the Wins-Favor Products Co., Shellane distributor at Hartford, the H. C. Waters Co., Paw Paw, and the R. B. Collis Co., Benton Harbor, Mich. In the rear of the booth stood a Shellane cabinet with two tanks of bottled gas, and in the foreground a complete modern kitchen in which a woman demonstrator prepared meals with the aid of the fuel unit and attractive gas appliances.

The second prize winner was the display at the Iowa State Fair, sponsored by several dealers. This booth consisted of a selection of attractive gas ranges, together with a two-tank installation of bottled gas. Dealers represented were the Des Moines Bottled Gas Co., Des Moines; Ose Hardware Co., Story City; Christensen Hardware Co., Ames; Redfield Hardware Co., Redfield; Service Hardware Co., Colfax, and the Tenhoff Hardware Co., Tama.

Pacific Producers, Inc. Asks Franchises in Idaho Towns

Pacific Producers, Inc., Los Angeles, Calif., is taking franchises and filing certificates of public convenience and necessity with the Idaho Public Utilities Commission in about 30 cities and towns in Idaho. The company is planning to serve air butane in the larger towns, while in the smaller some undiluted vapor systems will be installed.

The following towns are named in the proceedings: Idaho Falls, Rexburg, Blackfoot, St. Anthony, Nampa, Glens Ferry, Coeur d'Alene, Potlatch, Hailey, Ashton, Lewiston, Sandpoint, Bonners Ferry, Payette, Jerome, Rupert, Burley, American Falls, Gooding, Twin Falls, Buhl, Caldwell, Weiser, Wallace, Moscow and Orofino.

Suburban Gas Co. Completing Propane Plant at Belvedere

The Suburban Gas Co., Belvedere, N. J., is pushing forward to completion the propane distribution system in that city. Work was recently slowed up on the project through the failure of two banks in the city, but is now resumed. The distribution system will be served from an undiluted propane plant which also serves bottled gas users in the district. The system is designed to serve approximately 400 meters.

Construction of Plants at Flora, Ill., and Mt. Vernon, Ind.

Consolidated Utilities Corp., Chicago, Ill., of which Arthur J. Smith is president, reports that the plant being constructed at Flora, Ill., by the company is well under way, with materials on the ground for the distribution system, and the plant building completed. The office also is nearly completed.

Work on the plant at Mt. Vernon, Ind., is under way, following completion of financing and the formation of the company.

Air Butane Plant for Three Rivers, Quebec, Canada

City Gas & Electric Corp., Ltd., has erected a building of brick construction at Three Rivers, Providence of Quebec, Canada, to house butane air gas equipment, which will be installed shortly, to serve the city with gas for domestic, commercial and industrial purposes, according to D. W. Urquhart, assistant to the president of the company.

Mains are already laid in the district near the plant and a number of street services have been installed. It is planned to carry two pounds pressure in the mains. The capacity of the holder will be 60,000 cubic feet of gas and that of the butane liquid storage tank, 20,000 U. S. gallons. J. H. Warren is the resident manager at Three Rivers, and a store has been opened under his direction, with gas ranges and other appliances on display.

To Serve Butane in Cedar City

D. M. Ward, Eagle Rock, Calif., has been granted a franchise to serve air butane gas in Cedar City, Utah. About 500 consumers have been signed for the service.

National Bottled Gas Assn. Completes Organization

By CRAIG ESPY
Eastern Manager, Western Gas

THE National Bottled Gas Association, organized last October at Atlantic City to promote and develop the interests of the bottled gas industry, assumed permanent form at the Association's all-day meeting held January 12 in New York City with the voting of a constitution and by-laws and with the election of officers for the ensuing year.

The organization, which now represents about 50 per cent of the total number of bottled gas distributors in the country, is dedicated to the following objectives as set forth in the newly adopted constitution:

1. To promote and develop the bottled gas industry and to coordinate its activities to the end that it may serve to the fullest possible extent the best interests of the public.

2. To increase the effectiveness of bottled gas service for light, heat and power for the mutual benefit of the producers, distributors and users.

3. To advance to the highest efficiency the methods of manufacture, distribution, utilization, sales and accounting employed in the bottled gas industry and to collect, coordinate and disseminate ideas and information for this purpose.

4. To promote closer relations and cordial cooperation in all branches of the bottled gas industry.

5. To advance knowledge and learning in the sciences, and to stimulate invention and research, especially as applied to the bottled gas industry.

6. To cooperate with other organizations in efforts towards economic advancement, accident prevention, conservation, standardization and other activities.

Much of the January 12th proceedings were given over to the voting of the constitution and to discussion pertaining thereto. Mark Anton, elected president at the October meeting, presided at the session and during the course of the meeting was elected president for the ensuing year, as was also the entire slate of officers and directors elected at the Atlantic City gathering.

In the president's address, Mr. Anton urged that all members attempt to popularize the term "Bottled Gas". While many consumers know it as "cylinder gas", or "tank gas", it is felt that the industry will benefit by popularizing the one name designated. He emphasized in this connection the value of publicity and spoke of the desirability of having equipment manufacturers refer to bottled gas in their national advertising, through pointing out the adaptability of their equipment to bottled gas usage.

Mr. Anton also urged the creating of better relations between bottled gas distributors and public utilities, to the end that the latter, instead of desiring to serve bottled gas beyond their mains, will rely upon established dealers for this service. The possible appointment of a committee to work with the utility companies was suggested in this connection.

"The formulation of a Code of Marketing Practices is one of the most important matters now before the Association," said Mr. Anton in making the plea that all members of the Association send in ideas that should go into the make-up of this code. Mr. Anton also advocated that thought be given to the creation of an "approved equipment code", as the basis for the selection and use of proper equipment for bottled gas service.

SCAIFE

LIQUEFIED PETROLEUM GAS

CYLINDERS

MANUFACTURED
AND TESTED
TO MEET
INTERSTATE COMMERCE
COMMISSION
SPECIFICATIONS

WM. B. SCAIFE & SONS, CO.
OAKMONT, PA.
NEW YORK PITTSBURGH CHICAGO

LEADERS IN AIR BUTANE DEVELOPMENT ON THE PACIFIC COAST

▼

NATURAL GAS CORPORATION OF CALIFORNIA
NATURAL GAS CORPORATION OF WASHINGTON
NATURAL GAS CORPORATION OF OREGON
San Francisco and Portland

Manufacturers were also urged by Mr. Anton to build special equipment for butane and propane use.

Looking toward the time when a standard for operating cost could be set up, Mr. Anton advocated that a close study be given this subject. Another thought touched on in the president's address was the unfair competition arising in some sources from those who seek to mislead potential customers concerning bottled gas. A committee was suggested to devise methods for coping with this condition.

A motion was passed to incorporate the National Bottled Gas Association, and President Anton was empowered to appoint two members to assist him in the incorporation.

H. Emerson Thomas of Philgas Co., and a director of the Association, advocated that serious study be given to the Regulations of the Board of Fire Underwriters relating to bottled gas installations, pointing out the personal liability that bottled gas distributors might be subject to in the case of wrongly located services. In this connection a motion was made to provide every member of the Association with a copy of the Regulations of the Fire Underwriters.

Discussion was also entertained on the subject of an Association seal. It was voted that such a seal be prepared. Certain requirements which will govern the use of the seal will be set up later.

Paul G. Ford of the Columbia Engineering and Management Corp., and publicity director of the Association, spoke of his plans for securing the cooperation of manufacturers in giving public mention, through their advertising, to bottled gas. A plea was also made by Mr. Ford to the membership to send in news material arising in their companies so that this could be released to the proper media. Mr. Ford also paid tribute to the trade press for the cooperation he had secured. It was suggested by him that his committee be enlarged by the appointment of two additional members, and this was later put in the form of a motion.

A resolution submitted to the Resolutions Committee, composed of Paul H. Zook, Walter F. Vercamp and B. B. Stroud, was to the effect that those who had attended either the October meeting or those present at the January meeting who fulfilled admittance requirements and who immediately joined the organization, should be inscribed upon the books of the organization as charter members. This resolution was later re-submitted by the committee and was voted as the first resolution to be entered upon the books of the Association.

Following the voting of the by-laws as read by Don G. Kelley, vice-president of the Association, they were temporarily waived to allow for the re-election of the officers, who as previously mentioned, were selected at Atlantic City. These officers are:

Mark Anton, President, Suburban Gas Co., Belleville, N. J.

Don G. Kelley, Vice-President, Universal Bottled Gas Corp., Rochester, N. Y.

Plummer E. Pope, Vice-President, Fuelite Natural Gas Corp., Waltham, Mass.

John G. Rose, Treasurer, Jack Rose Auto Supply, Pittsfield, Mass.

Richard F. Ely, Secretary, Island Home Commodities, Inc., Hicksville, N. Y.

Directors in addition to the above are:

H. Emerson Thomas, Philgas Co., New York, N. Y.

H. S. Bunn, Pyrofax Division, Union Carbide & Chemical Co., New York, N. Y.

Chas. G. Nourse, Suburban Gas Co., Cranston, R. I.

H. E. Double, Bradford Gasoline Co., Bradford, Pa.

W. H. Frank, Pyrofax Distributor, Poughkeepsie, N. Y.

The constitution provides that there shall be 10 directors of the Association and that the officers shall be elected from the directors. The directors, together with the retiring president, constitute the executive board.

The last motion submitted for vote at the day's session committed the Association to semi-annual meetings, the next one to be held in April in New York City. The Constitution provides that the annual meeting of the Association shall be held in October or November.

No definite plans were outlined at the meeting for the creation of Geographic Divisions of the Association. However, the Constitution has the following to say regarding the subject: "The Executive Board may authorize the organization of one or more sectional or regional divisions whenever the formation of such divisions may seem to it to be desirable."

Under "Officers and Organization", the Constitution also provides that there shall be one sectional chairman elected each year for and by each section or region as created by the Executive Board.

Another clause states that "the Executive session may make with any similar association an affiliation agreement providing the objects or interests of such association are not in conflict with those of the National Bottled Gas Association."

The membership of the Association is made up of the following classifications: "Bottled Gas Distributing Company Members; Liquefied Petroleum Gas Producing Company Members; Dealers and Agents of Bottled Gas Members; Associated Company Members; Honorary Members.

Governing factors provided in the constitution regarding these classifications are:

1. Bottled Gas Distributing Company members shall be companies engaged in the purchasing and/or distributing of bottled gas for light, heat and power in wholesale quantities and shall be only such companies as have a substantial investment made in their own cylinders and equipment.

2. Liquefied Petroleum Gas Producing Company members shall be companies engaged in the production of Liquefied Petroleum Gas or Liquefied Hydrocarbon Gas.

3. Dealers and Agents of Bottled Gas members shall be those selling service and bottled gas appliances.

4. Associated Company members shall be those who manufacture and sell bottled gas burning appliances, apparatus and other equipment for use with bottled gas.

5. Honorary members shall be those who, on account of their standing or qualifications, in the opinion of the Executive Board, are entitled to such honor. They shall have all the privileges of individual members, except the right to vote or hold office.

Association executives wish it to be known that they will welcome the attendance of appliance and equipment manufacturers or their representatives, at all future meetings.

Attendance at the session numbered 49.

W. E. Keefe

Homer Mead

Keefe Manager at Pomona; Mead Promoted at Monrovia

WALTER E. KEEFE, for a number of years manager for the Southern Counties Gas Co. in its Monrovia district, has been named successor to Charles G. Spencer, former Pomona district manager, whose tragic death was announced last month. The promotion of Mr. Keefe was announced on January 2 by President F. S. Wade.

Mr. Keefe takes over the management of the larger district with a background of gas utility experience and active cooperation in community building covering approximately 25 years. Prior to coming to California, he served in an executive post in the offices of Rufus Dawes in Chicago for 12 years. In 1919 he became assistant superintendent of the Southern Counties properties at Whittier and was appointed superintendent at Monrovia the following year. In 1923 he was made district manager at Monrovia.

With the transfer of Mr. Keefe to Pomona, the managerial vacancy in Monrovia has been filled by the promotion of Homer Mead, former district chief clerk, who has been with the company since 1918.

The Monrovia district includes Arcadia, Sierra Madre, El Monte, Rosemead, Duarte and Temple.

Telephone Line Completed for Use in Maintenance of Gas Carrier

A telephone line, constructed for the use of the Montana Power Co. of Butte along its 225-mile gas transmission line from Cut Bank to Butte, was recently completed and placed in service by the Mountain States Telephone and Telegraph Co. The telephone line is 256 miles long and was built at a cost of $120,000. More than 500 miles of copper wire were used in its construction, as well as 3,600 cedar poles, each 20 feet high, to complete the circuit. The line is used chiefly for the purpose of checking any possible leakage and interruption of service, and for supplying information regarding temperature, barometric pressure and weather conditions generally.

Simmons Adds Sales Manager Work to His Present Duties

L. D. Simmons, director of publicity and advertising for the Wasatch Gas Co. and the Utah Gas & Coke Co., Salt Lake City, Utah, has been named domestic sales manager for the two companies, and for the Ogden Gas Co., Ogden, Utah. Mr. Simmons will continue to handle the publicity and advertising work for the companies.

Martinsburg, Mo., Expects "Natural" Service Early in March

Martinsburg, Mo., has granted a natural gas franchise to the Missouri Power & Light Co., Kansas City, Mo., supply to come from the Panhandle-Eastern Pipe Line Co.'s main carrier. Service is expected early in March.

Personnel Changes on Community Natural System Announced

The Community Natural Gas Co. has recently announced the following changes in personnel and management of division operations:

John Hendricks, special representative for the company, has recently moved his headquarters from Sweetwater, Texas, to Abilene.

J. S. Bourn has relieved R. A. Nutt as manager in charge of the Winters district in the Brownwood division. Mr. Nutt has left the company. Mr. Bourn was transferred from the Sweetwater Division where he had charge of the towns of Merkel, Trent and North Park, Abilene. As soon as arrangements can be made to have the Abilene forces take over the operation of the North Park plant, operations of the Merkel and Trent plants will then be handled directly out of Sweetwater.

Raymond Neal, now assistant cashier at the Sweetwater office, will temporarily relieve Mr. Bourn as manager at Merkel.

James A. Farrell Resigns as Pres. of U. S. Steel Corp.

James A. Farrell, president of the United States Steel Corp., resigned that position on January 12, to take effect at the meeting of the board of directors of the company on April 18. Announcement of a successor has not been made, and it is believed that the new president will be named at the April 18 meeting. Mr. Farrell will occupy a position on the board of directors.

Natural Gas Dept. Convention Opens May 9 in Tulsa, Okla.

PLANS are under way for the annual convention of the Natural Gas Department which will take place at Tulsa, Okla., May 9, 10 and 11. Captain A. E. Higgins, secretary of the department, was in Tulsa in January and program details are already being whipped into shape.

A. E. Higgins

The following have been announced as members of the publicity committee for the annual meeting of the Natural Gas Department:

B. F. Pickard, Oklahoma Natural Gas Corp., Tulsa, chairman; R. J. Daugherty, Empire companies, Bartlesville, Okla.; John Fletcher, Arkansas Natural Gas Corp., Fletcher, Arkansas Natural Gas Corp., Shreveport, La.; Will C. Grant, Lone Star Gas Co., Dallas, Texas; C. D. Greason, Gas Service Co., Kansas City, Mo.; Charles Jordan, Pacific Gas and Electric Co., San Francisco; R. T. Ratliff, Kansas City Gas Co., Kansas City; W. D. Thurber, Southern Counties Gas Co., Los Angeles, and Winfield Foster, Peoples Gas Light & Coke Co., Chicago.

The publicity committee held its first meeting January 19 at the Kansas City Athletic Club, Kansas City.

St. Paul Denies Natural Gas Permit to Northern States Power

According to report from the press of the district, citizens of St. Paul voted against the Northern States Power Co.'s petition for a franchise to serve natural gas there.

AT RIGHT: View of exhibition booth which the Seattle Gas Co. maintains in the Security Market. Since adequate space was lacking in the company's present headquarters, home service facilities have been operated with great success from the public market location.

AT LEFT: Model kitchen of the company on the balcony of the Security Market.

Cooking Schools and Demonstrations

(Continued from Page 25)

demonstrations by the newspapers. Lacking a kitchen of their own, the Seattle Star holds two demonstrations weekly in the gas company's kitchen in the Security Market.

The largest cooking school of the year was sponsored by the Seattle Times, and conducted by Miss Ella Lehr, cookery expert. The Seattle Gas Co. and three of the leading dealers in gas ranges were represented in the school, and a different make of range was used each day. Approximately 3,000 women were enthusiastic and attentive listeners to Miss Lehr's story of modern gas cooking and refrigeration. At the conclusion of the school, modern gas ranges were given away to each of the four women giving the best written answer on "Five Reasons Why I Prefer to Use Gas."

This brief outline of activities as carried on during recent months in addition to weekly demonstrations and home calls, shows some of the work that can fall to the home service department to build better customer relations. It builds up a friendly feeling between seller and buyer. It makes for good will, and develops satisfied and enthusiastic customers.

With a new business era to cope with, and with competition keener than ever before, an intensive program is planned for the 12 months ahead, the company following in a general way the plan outlined below, although realizing that no definite iron-clad program can be presented to meet the demands in all localities. However, it will be a goal toward which to work.

1. Dinners to Prospects

In a New York company these dinners have been given a trial and have proven successful beyond expectations. Good prospects, who for some reason do not sign their name on the dotted line were invited to the home service department for a simple dinner at 6:30. The guests were invited to come several hours in advance to see the dinner prepared and cooked. At the appointed hour the dinner was served, with the salesman assisting the home service director as host. After dinner, with both husband and wife together, it was found a simple matter to close them, some of the demonstrations proving 100 per cent successful.

2. Contact with Builders and Realtors

Men in the building and related fields play an important part in load building, and a plan of cooperation with them will gain their good will, and will help to influence them to specify or install all gas equipment in their new buildings.

3. Entertaining Women's Clubs

Inviting club women to the department for special group meetings to acquaint them with the gas company and the service it has to offer them will create a feeling of friendliness and confidence. The auditorium when not in use by the company, should be open to club women for their meetings without charge to create this friendly atmosphere.

4. Girl Scouts and Campfire Girls

These groups are usually interested in all phases of home making, and should be looked upon not only as potential customers, but as present customers as well, inasmuch as many belong to families already using gas. Mem-

bers of these organizations receive merits and awards for accomplishing various home making tasks.

5. Radio Talks

When possible, this form of publicity is of great educational value. To be most effective, the broadcasting should be carried on during the hours when most women are at home and not too busy to listen. From 10 to 12 in the morning, and 1 to 2:30 in the afternoon are the most opportune hours.

Subjects should be treated in a way to appeal to the majority of the listeners. The preparation of seasonal foods, party menus, and special recipes are always popular, and the application of gas in the process of preparation can be worked into the program in an interesting manner.

6. Continued Lectures and Demonstrations with the University

7. A Broader Knowledge of the Gas Industry

Since many customers know the home service worker as the gas company, it is a part of her work to know the company policies, and to understand the workings of the organization as a whole.

The benefits to be gained by a utility through the home service departments are numerous. Its results are first felt in the friendliness of the community toward the company, especially when the women come to know the department and turn to it for help with daily household problems.

Standard Manhole Frames and Covers

(Continued from Page 28)

Flared type round base
Flared type square base—(height 10 inches)
Flared type round base—shallow
Flared type square base—shallow
Flared type square base—(height 7 inches)
Flared type square base—light weight
Straight type square base
Straight type round base—for inner cover
Straight type square base—for inner cover
Straight type round base—shallow—flange midway between top and bottom—for inner cover
Straight type square base—shallow—flange midway between top and bottom—for inner cover
Shallow ring

To indicate the need for the proposed standard Mr. Fish, chairman of the committee, cites the case of one city alone having a population of about 500,000 in which it is estimated that there are at least 100 different types and sizes in use. A single foundry in another city reports that it has about 2,000 different sets of patterns for manhole frames and covers, and nearly 600 of these sets of patterns are listed as being active at the present time.

Mr. Fish comments further upon the lack of standardization as follows:

"It has been said that manhole frames and covers are the least standardized articles in commerce. Even in the matter of such a simple detail as the size of the opening there has been no attempt heretofore to adopt a range of sizes that could be used satisfactorily throughout the country.

"The great majority of these differences in type and size cannot be justified on any logical basis. Of the manhole covers in use today some are square while others are rectangular; many of them are round and some have been noted that are elliptical in shape. A still further variation in the general shape can be found in the rectangular or square covers which are made with the corners rounded to an appreciable radius. In each one of the general shapes just mentioned a great many different types and sizes have been produced owing to different ideas in regard to details of design such as ribbing, holes for lifting hooks, dimensions, and pattern of the top of the cover. All this has resulted in numerous designs which are not only ill-suited in many cases to the purpose intended but to foundry practices as well.

"Obviously this is a field in which there is considerable to be gained through simplification and standardization. For example, breakage due to insufficient metal, poor quality of metal, and non-uniform distribution of the same could be eliminated; special core work and other increased costs of molding to care for unnecessary features, that have been introduced into what was previously a good practical design, would not be necessary; duplication of patterns and increased pattern costs where slight and unnecessary changes in design necessitate a new pattern would be things of the past; and waste of metal where castings are made too heavy would not occur.

"In addition to all the advantages obtained through elimination of these undesirable features, the standardization of the relatively few necessary types and sizes would permit greater quantities of castings to be contracted for at one time and the consequent lowering of costs. Where there is a continued demand for the same types and sizes of castings, manufacturers do not hesitate to carry a reasonable stock, and the manufacture of these stocks can be carried on during dull periods, thereby helping to keep men employed and at the same time reducing overhead expense."

Copies of the draft presenting the proposed standard types are available from the American Standards Association, 29 West 39th Street, New York, N. Y.

Controlled Heat for Milk Condensing

(Continued from Page 31)

automatically soldered shut by means of a gas-fired soldering machine.

From the capping room the filled cans are conveyed to the sterilizer room and subjected to sufficient heat to kill any bacteria which may be present and to make the milk absolutely sterile. The entire process is completed within a period of approximately five hours from the time the milk first enters the plant.

From the sterilizer room the cans of milk are taken to the warehouse, where they are stored from a week to 10 days, following which they are inspected so that any "bulged" cans may be eliminated from the stock. Before they are labeled, however, they are given a severe shaking in a machine to remove a clot, or what is commercially termed "liver," which forms during the process of sterilization. This shaking produces the smooth, creamy milk familiar to millions of users. The cans are then labeled and placed into cartons by machine. Cartons are sealed by placing the open, filled carton on a conveyor passing beneath a suspended bent iron rod which closes the inside flaps as the box passes. The outside flaps pass through a glued roller and are then folded over and pressed down under a second roller as the carton emerges at the end of the conveyor ready for the market.

The installation of natural gas equipment at the Carnation Co. plant in Gustine was taken care of under the direction of the industrial gas department of the Coast Counties Gas and Electric Co. It included the placing of four NGE type A burners in each of the two 200-H.P. boilers converted. Heat losses from the fire boxes were minimized by the construction of the floor, which consists of two courses of fire brick, a layer of Sil-o-cel and a layer of hollow tile. This hollow tile is vented on the side of each boiler and the air drawn in is discharged directly underneath each set of burners. In this way the air passes on its way to the combustion chamber, accomplishing the dual purpose of preventing undue deterioration of the floor and bringing back to the combustion chamber heat which might otherwise be lost.

Upon entering the plant metering station, the gas passes through a 4-inch gas filter before entering the metering equipment, which consists of four displacement meters equipped with volume-, pressure- and temperature-recording instruments used for correcting the gas to base pressure and temperature.

A 4-inch balanced valve gas pressure regulator reduces the pressure from the 20 pounds at which gas is delivered to the plant to a 10-pound operating pressure. A burner pressure ranging from 1 to 6 pounds, depending upon the steam load, is provided by means of a 4-inch fuel regulator actuated by steam pressure. The boiler room is equipped with a CO_2 recording instrument which indicates the efficiency of combustion. It is estimated the plant will use approximately 12,000,000 cubic feet of gas per month, with a comparatively constant operation throughout the year.

The Carnation Co. of California plant No. 23 is located in the heart of California's richest dairy country, the San Joaquin Valley, and while it is their only plant in California, it is one of 45 plants located throughout the United States.

Up until the past year gas has not been available in this territory, but with the building of the Stan-Pac line for the service of gas in northern and central California, it was made available by Coast Counties Gas and Electric Co. This new section of Coast Counties is known as the Valley Division, of which H. A. Eldridge is district manager. Although at the present time residential consumers are comparatively small in number, the potential industrial load makes this one of the most important sections of the territory served by the company.

Geneso-Milwaukee Extension To Be Completed This Summer

Construction of the Geneso-Milwaukee extension of the Natural Gas Pipeline Co. of America, formerly known as Continental Construction Corp., Chicago, has been temporarily deferred on account of weather conditions in the territory, according to E. V. Kesinger, general superintendent of the company. It is probable that construction of the line will be completed in the summer months.

A Natural Gas Cotton Dryer

(Continued from Page 23)

ing the dryer as set up at Corcoran, and showing the exterior of the furnace with the hole for inserting the gas burner. Over 2,300 bales of high grade cotton and more than 700 bales of bollie cotton were put through this dryer at Corcoran during the 1930 season in a period of approximately 60 days. The dryer was run day and night while surrounding gins not so equipped were at a standstill due to the long unbroken foggy spell which occurs each year in the San Joaquin Valley in California.

Probably a third of the cotton producing area of the United States could make profitable use of this appliance. As natural gas is available throughout a large part of this area, particularly in the Mississippi Delta and Gulf Coast region of Texas, the device should result in a considerable increase in the use of natural gas.

Brinkley to Manage El Reno Office for Oklahoma Natural

GEORGE W. BRINKLEY, assistant city office manager of the Oklahoma Natural Gas Corp. in Tulsa, has been named manager of the company's El Reno office, it has been announced by E. A. Olsen, president. The appointment was effective at once.

Geo. W. Brinkley

Mr. Brinkley succeeds John Lockridge, resigned. He has been with the company since March 3, 1916, and has spent all his time in the Tulsa office. He entered the employ of the company as a clerk and has risen steadily through different positions to the one which he now holds.

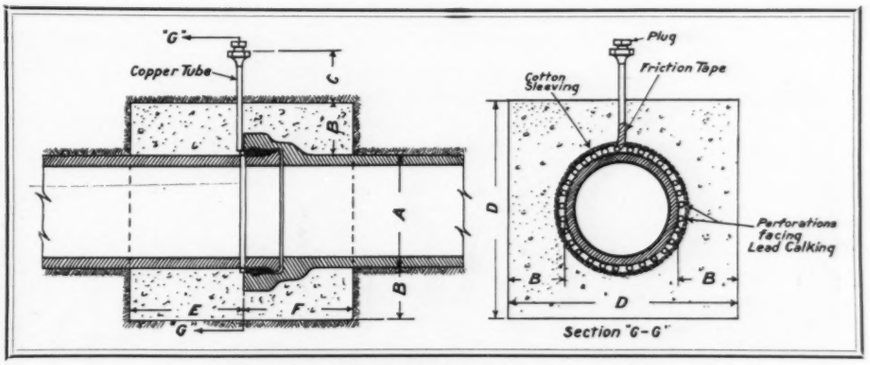
Before joining the Oklahoma Natural, Mr. Brinkley spent two years with the Kansas Natural Gas Co. on construction work and two years with the Fredonia Natural Gas Co. in the city plant.

To Try for Natural Gas Supply in San Diego Area

In an endeavor to find a supply of natural gas near the city of San Diego, Calif., plans are now reported under way for carrying on drilling operations on the site of the former Camp Kearney, army post during the war. F. Leslie Meeker of San Diego and J. E. Koeberle, Los Angeles, are reported to have completed plans for drilling in that area.

Representatives of the Pathfinder Oil & Gas Co. of San Juan Capistrano, Calif., have appeared before the San Diego city council and have interviewed W. F. Raber, head of San Diego Consolidated Gas and Electric Co., with proposals to serve the city from a source near San Juan Capistrano, where gas development is already reported under way.

A hearing is scheduled to be held on February 9, at which time the California Railroad Commission will consider the request of the city that the San Diego Consolidated Gas and Electric Co. be required to serve natural gas there.



Sectional elevation, Knopp Leakproof Concrete Joint.

The Knopp Leakproof Concrete Joint

GAS & ELECTRIC FACILITIES, LTD., 447 Sutter St., San Francisco, Calif., has placed on the market a concrete joint for bell and spigot cast iron pipe, known as the Knopp Leakproof Concrete Joint. (Pat. Pending.)

The method of applying the new joint consists of inserting a perforated tube around and against the bell of the joint, pouring concrete around this joint, letting the concrete set, and then forcing a specially prepared emulsion (through the perforated tube) within the concrete against the joint. This emulsion reacts with the concrete to form insoluble salts which plug up the pores of the concrete on the inside and stop any possible leakage. A special gas vent is used to allow the gas to escape while the concrete is setting, when one of the concrete joints is being installed around an extremely bad leak. If the hole must be closed the same day, calcium chloride is used to set the concrete up within four hours.

The new type joint has been subjected to test under a variety of field conditions for several months past on the Pacific Gas and Electric Co.'s East Bay system, and is now being introduced to the national market.

Research Work on Utility Merchandising

RICHARD A. HARVILL, research assistant in the Institute for Economic Research of Northwestern University, Evanston, Ill., is conducting a study of the "Economic and Legal Aspects of Public Utility Appliance Merchandising." The results of the study probably will be available by about June 15, 1932..

According to Mr. Harvill the work will cover the following general subjects:

I. Introduction: Purpose, Scope and Method of the Study.

II. Historical Development of the Retail Market for Gas and Electric Appliances.

III. System of Distribution for Gas and Electric Appliances.

IV. Opposition to Utility Merchandising.

V. Utilities' Economic and Legal Justification of their Merchandising Activities.

VI. Legal Status and Public Control of Utility Merchandising.

VII. Accounting for Utility Merchandising Operations.

VIII. Dealer-Utility Cooperation.

IX. Conclusions.

P. G. and E. Plans Large Expenditures in 1932

The major project on the 1932 gas transmission line construction program of the Pacific Gas and Electric Co., San Francisco, is the laying of a new main to increase San Francisco's supply of natural gas. This line will tap P. G. and E.'s present carrier at Milpitas, and will traverse the San Francisco Peninsula. Its cost is estimated at $2,000,000. The San Francisco end of the new feeder main is nearing completion, and consists of 7½ miles of 26-inch high-pressure pipe line being laid from the gas plant at the Potrero terminus, where $10,000 is now being spent in tying-in the lines. A 20-inch line will connect at the outskirts of San Francisco with the 16-inch branch of the main 20-inch line from Kettleman Hills. This will mean that two mains, approximately 3 miles apart will bring gas into the city of San Francisco when the tying-in lines are completed. Either main supply line can be by-passed and the other used, should the occasion demand.

Beside the major transmission line projects, the company is reported to be planning additions and improvements to both its gas and electric distribution systems.

Gallagher Named Head of New Consolidated Oil Corp.

Official announcement was made during the middle of January that the merger of Prairie Oil & Gas Co., Prairie Pipe Line Co., and the Sinclair Consolidated Oil Co. and its subsidiaries is now practically assured. The name of the new company will be the Consolidated Oil Corp., with H. R. Gallagher reported selected as president.

Mr. Gallagher has been senior vice-president and executive officer of the Shell organization on the Pacific Coast, and has been identified with the development of the territory since 1910. He is a director and vice-president at large of the American Petroleum Institute and is identified with other activities of the oil industry in the West.

The merger will be final after a vote by stockholders of the two companies.

THE SATURDAY EVENING POST

Blinders... *because she Shies At New Ideas*

FLYING MACHINES, horseless carriages—they had their skeptics. Every new idea, every great advance, does. Electrolux is no exception.

We don't mind that. For though Electrolux is four years old, has enjoyed a phenomenal success and is today in hundreds of thousands of homes, it is still the new idea, the big radical improvement in automatic refrigerators.

All we ask is that you go and see Electrolux with your eyes wide open. Judge the facts first hand.

You will find that Electrolux not only freezes ice cubes quickly and provides perfect constant cold always, but does this without sound, without machinery and at much less cost than any other refrigerator.

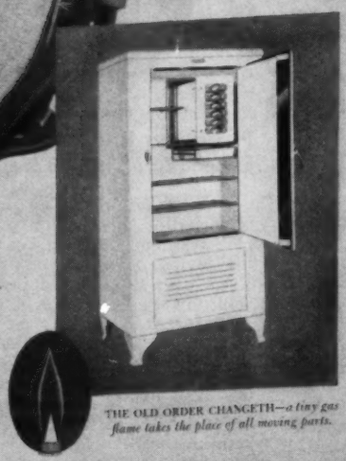
Is it any wonder that Electrolux sales in 1931 were far ahead of 1930?

You certainly owe it to yourself to see this remarkable refrigerator that has so greatly changed the old order of things. It is on display at the showroom of your gas company.

And if you'd like complete information by mail, write to us direct for free literature. Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

ELECTROLUX

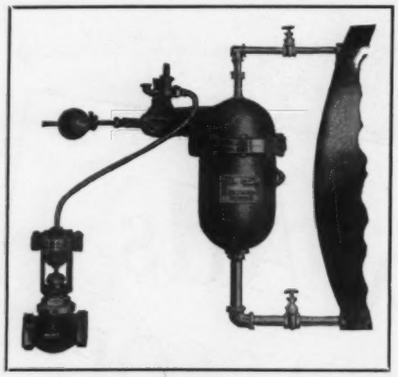
THE *Gas* REFRIGERATOR



THE OLD ORDER CHANGETH—*a tiny gas flame takes the place of all moving parts.*

THIS ADVERTISEMENT APPEARS IN THE SATURDAY EVENING POST, TIME, COLLIER'S, AND GOOD HOUSEKEEPING

THE SATURDAY EVENING POST
Electrolux Ads
PACK A NEW WALLOP
in 1932
SUPPOSE you had to write Electrolux advertising. Would you find it necessary to concoct some makeshift sales story . . . play up some unimportant gadget? *You would not!*
Though more than 250,000 Electrolux have been sold during the past four years, the principle of Electrolux—of gas refrigeration that produces *constant* steady cold, with no stopping and starting—is still dynamic with news. It's radical, different . . . PLUS the fact that Electrolux is *more practical*, more economical than any other type of domestic refrigeration that has yet been devised . . . or is apt to be devised for a long time!
That's why you'd do just what we've done in preparing Electrolux advertising for 1932! You'd put *that* story into a form that would be certain to catch the attention . . . stick in the mind . . . demand action.
On the opposite page is reproduced the first of the 1932 series of advertisements for national magazines.
It won't be necessary to tell you to read this advertisement carefully. *You will!* But more than that, *try this as a test.* Let us send you an enlargement of this advertisement to hang on your wall. Watch the people who come into your office. Watch how few can resist the desire to read it once the headline has caught the attention. Note the comments! Then you'll know why Electrolux advertising this year is backing your sales effort more forcibly than ever before! Electrolux Refrigerator Sales, Inc., Evansville, Ind.
ELECTROLUX
THE *Gas* REFRIGERATOR



CF

Dependable–of course

The Vigilant Liquid Level Regulator, by remote control, is designed to maintain constant oil level in both the absorbing tank and the still, where gasoline is manufactured by absorbing the gasoline in oil and subsequently separating it from the oil by distillation.

This regulator will accommodate itself to any type of absorber or steam still, and maintain a constant oil level under pressure.

More than forty years of successful experience in the manufacture of regulators assure to the purchaser absolutely accurate and reliable equipment.

Write for Catalogue

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes from 1 inch to 24 inches; For all Service, 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES

WESTCOTT & GREIS, Inc. — Sales and Service — Dallas — Los Angeles

JNO. W. CRAWFORD — Sales Engineer — 1855 Industrial Street — Los Angeles

PARSONS ENGINEERING CO. — Los Angeles, Calif. — San Francisco, Calif.

Or Any Jobber

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

513 CENTRAL BANK BUILDING, DALLAS, TEXAS

Year Round Air Conditioning

(Continued from Page 30)

various interested branches of engineering with the possibilities of gas so that, from the very beginning, they would begin to think in terms of gas when they thought of residential year round air conditioning. This applied particularly to manufacturers of warm air furnaces, or winter air conditioners. It is very gratifying to note that practically all the responsible organizations in the country who are now working toward the development of complete summer air conditioning for the home are working with heat as the source of energy.

Beginning of Field Work

Last winter the Research Committee secured the approval of the Executive Board to an appropriation that made it possible to take the knowledge and experiences that had been accumulated and with that as a basis complete designs for a workable residential gas operated summer air conditioner. This was done and for the first time in summer, gas was sold for this purpose in the test dwellings. These installations were based on the use of Silica-Gel adsorbant properties, as in the larger commercial jobs, but considerable research and development had to be carried on before the peculiar conditions of residential usage, which I.previously outlined, could be met.

Through the courtesy of the Consolidated Gas Co. of New York, and The Peoples Gas Light and Coke Co. of Chicago, suitable test houses were located, the owners and occupants were properly lined up to carry on their part and the two installations were operated most of the summer. It had been planned to also make a test installation in the south, but difficulty in securing a suitable house prevented that. However, it will probably be made next summer with greatly improved equipment.

Equipment Used

The equipment was built (except for blowers, filters, etc.), and made ready for assembly by the Silica Gel Corp. of Baltimore, Md., as a result of preliminary research it had carried on for the Association. It consists of units for dehumidifying the air (direct absorption of water vapor from the air by beds of Silica Gel), filters, and cooling units.

Due to the efficient manner in which moisture is removed from the air by Silica Gel, only a portion (10 to 20 per cent) of the total volume of air handled passes through the Gel beds. In the Chicago installation, the availability of a supply of water having a low temperature (max. 73.0°F.) and a low price (60c per 1,000 cubic feet) made it desirable to cool the air with water coils instead of by refrigeration.

Dry filters were used, as this type of filter is rather easy to clean and would cause the least inconvenience to the customer when cleaning becomes necessary.

Silica Gel as a Dehumidifier

As intimated before, the drying of the air is accomplished by means of the peculiar affinity which Silica Gel has for moisture. Silica Gel is a transparent, crystalline substance whose composition (silicon dioxide) and appearance are not unlike clear quartz. Experience, however, has disclosed that these crystals are highly porous, the pores being of submicroscopic proportions. When moist air is brought in contact with this substance,

The artistic design of the new Ambassador disguises a fan-forced gas-fired unit heater of 20,000 B.T.U. input rating. Temperature is controlled by a self-contained thermostat. It can be equipped to burn either natural or manufactured gas.

In Your Own Home!

When you relax in your easy chair during the chill days of Fall or Spring or the extreme cold days of winter, and read your evening paper in absolute comfort —knowing you are saving many dollars in the operation of your central heating plant—then you begin to appreciate the great sales possibilities for the new Humphrey Ambassador in other homes within reach of your gas lines. Then you see why this new automatic forced air heater is the ideal "helper" or "booster" unit for homes in cold climates or for complete house heating in warmer zones.

Offices, stores, shops, and similar small or medium size places can also benefit from the Humphrey Ambassador. And every installation means a profitable increase in your gas load.

Quick and easy to install, free from service need for many months or years, the new Humphrey Ambassador is one of the items gas men have been looking for to build profitable gas sales. Investigate it today. Write for complete information.

General Gas Light Company

Kalamazoo, Michigan

C. B. Babcock, Pacific Coast Manager, 135 Bluxome St., San Francisco

VITEX

The Perfect Gas Vent and Flue Pipe

APPROVED

Officially
by the
National Underwriters
Laboratories
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WRITE
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GROBLE REGULATORS & GOVERNORS

Complete Line of Regulators for

Natural, Manufactured, Butane and Propane Gas

Pacific Coast Representative,

T. G. ARROWSMITH COMPANY,

661 Howard Street San Francisco, Calif.

Phone Garfield 8419

GROBLE GAS REGULATOR COMPANY

Office and Factory: Anderson, Indiana

the pores absorb water vapor much as a sponge absorbs water. In order to accomplish dehumidification air is blown through beds of this Gel. After a period of time, however, the beds become saturated and can absorb no more moisture. For this reason, it is necessary to have two such beds in each installation: While one is in use, the other is being "reactivated," or dried out.

Reactivation is accomplished by the application of heat, which dries the bed by evaporation. A small gas furnace is used for this purpose. The products of combustion of this furnace are blown through the bed, drying it out and carrying the moisture up the flue.

When the bed has been thoroughly dried it is quite hot (210°F.), so that it must be cooled before it can be used. A closed circuit of air is used for cooling. The air is cooled by passing over coils of pipes through which city water is running and then is blown through the Silica Gel bed, returning to the cooling pipes, etc. The same air is used over and over again for the cooling of the beds. Thus, it becomes very dry and does not affect the moisture-absorbing capacity of the reactivated bed.

The operation of the Silica Gel beds is completely automatic. For one hour a bed is in operation. At the end of that hour, an electric clock throws a switch which causes valves to close, diverting the air from the first bed to the second. When these valves are set, a fan is put in motion which draws air through the gas furnace and blows it through the saturated bed. As this air reaches its maximum velocity the gas is automatically turned on and ignited. For the next 36 minutes the gas furnace is in operation, at the end of which time the gas is automatically turned off, water begins to circulate through the cooling pipes and the closed circuit of cooling air is put in motion. Cooling is accomplished in 24 minutes, so that it takes exactly an hour to dry and cool the bed. By that time the second bed has become saturated, and the process of drying and cooling is shifted to the second bed.

Hence, a continuous flow of dry air is coming from the dehumidifying unit. This air is quite warm. It was warm when it entered the unit; the beds of Silica Gel are warm and add somewhat to the heat of the air; and finally, the process of extracting moisture from the air produces heat. Therefore, the air must be cooled before it is delivered into the rooms. Furthermore, the dehumidifying unit is so efficient that it actually dries the air too much. Air coming directly from the Silica Gel beds is too dry for comfort, and so it is diluted with inside air before passing through the cooler. This inside air has already circulated through the house and is of a higher relative humidity than the treated air. The mixture first used on the Chicago installation consists of about 10.5 per cent dry air and 89.5 per cent return air. Arrangements were made, however, to increase the percentage of dry air by decreasing the volume of inside air. The mixture is filtered to remove impurities and a blower-type fan then forces it through the cooling unit.

The cooling unit consists of a series of sections, each section being constructed of copper tubes with copper radiating fins. City water is run through the tubes, and the air in blowing over the tubes and fins is cooled.

Arrangement of Ducts and Equipment

Intake ducts are so arranged that outside air, inside air, or a mixture of both can be passed through the Gel beds. It has been found that the best results are obtained when only outside air is used. In this way, new air is being constantly added to the supply of inside air, so that the atmospheric pressure inside the house is slightly higher than it is

Detroit Jewel · Garland
Super De Luxe

1932 style, quality, and features ...and a 1912 price tag

● This is the gas range for the woman who wants the best, regardless of price. Yet, price is one of its most attractive features, for never before has such a range been priced so low. Standard equipment includes *every modern feature found in the highest priced gas ranges,* and the cooking top is 27 x 20—largest of any console type range on the market. Priced to fit into 1932 budgets. Women who have paid up to $200 for a gas range, and who know quality, will be astonished at the price tag on the Super De Luxe—a 1912 price tag on a 1932 model. And—*there's a full margin of profit for you.* Send for the complete catalog and list of trade discounts.

Detroit-Michigan Stove Company · Detroit, Michigan

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MAKE USE OF OUR OFFICES as headquarters during your visit to the Olympic Games.

YOUR MAIL may be forwarded in our care.

USE OUR FREE stenographic and telephone service.

HOTEL RESERVATIONS and sight seeing trips planned for you.

MEET YOUR friends here.

124 West 4th Street
Los Angeles

Stop at San Francisco on your trip to or from the Olympic Games. The same facilities are offered you at the San Francisco office of WESTERN GAS—447 Sutter Street—San Francisco

WE'LL BE GLAD TO SEE YOU.

A
NEW BATTERY
GOES INTO ACTION
AT THE
OLD PRESIDIO

THE OLD PRESIDIO at Monterey which has played such an important part in California history is now the site of the West's finest Reserve Officers' Training Camp. There, in the fourteen permanent new mess halls and the post hospital, a new battery has gone into action . . . a battery of fifteen Madsen Ranges.

Lieut.-Col. J. L. Topham, post quartermaster, soon to be transferred to Fort Knox, Kentucky, made the selection and installation of California's finest ranges in California's oldest presidio one of his last official acts at Monterey. This veteran officer, with thirty years' experience in the quartermaster service, knows values. His good judgment will be an excellent guide for others to follow in equipping their kitchens.

MADSEN
IRON WORKS, Ltd.

P. O. Box 601, Huntington Park, Calif.
(Suburb of Los Angeles)
San Francisco Factory Representative:
Fred R. Sanford, 837 Howard Street

We Can Deliver to West and Southwest
Equally as Low in Price as in Middlewest

LUX PURIFYING
MATERIAL

MOST ECONOMICAL BECAUSE
MOST EFFICIENT
ALSO LASTS LONGER
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THE ALPHA-LUX CO., Inc.

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REFRACTORIES
For Gas Appliances

Genceraco Refractories are made in all shapes and sizes, in color, decorated or plain and in any quantity. They may be had in dense as well as porous material. These refractories are extremely resistant to thermal shock and are physically strong. We will gladly send you a quotation on your requirements for space heater radiants, leaning baffles, back walls, tunnel radiants, radiant sticks, burner tips, or any special pieces.

GENERAL CERAMICS COMPANY
71 West 35th Street, New York, N. Y.

outside. As a result, infiltration is practically eliminated.

This outside air is passed through a dry filter before being introduced into the dehumidifying unit. The filter is of simple construction and can be cleaned easily and quickly by replacing the filtering elements when dirty. The air then enters the process of dehumidification.

It is common knowledge that high relative humidity in the summer months is as distressing as high heat. What is not as well known is the fact that when air is cooled without removing any of the water it contains, the relative humidity of that air is raised. (Relative humidity is the amount of water contained in the air in relation to the maximum amount that the air could carry at that temperature without precipitating.) Since the water-carrying capacity of air varies with the temperature of the air, lowering the temperature without reducing the actual amount of water present raises the relative humidity. It is for this reason that air which has been cooled feels damp to the skin. Cooling the air, if not overdone, adds to the comfort, but greater comfort is secured if some of the water present is removed when the air is cooled.

After the mixture of properly dried air has been filtered and cooled, it is introduced into the bottom of the gas-fired warm air furnaces which heats the home in winter. The cool air is forced into the rooms by way of the warm air ducts and registers of the regular heating system.

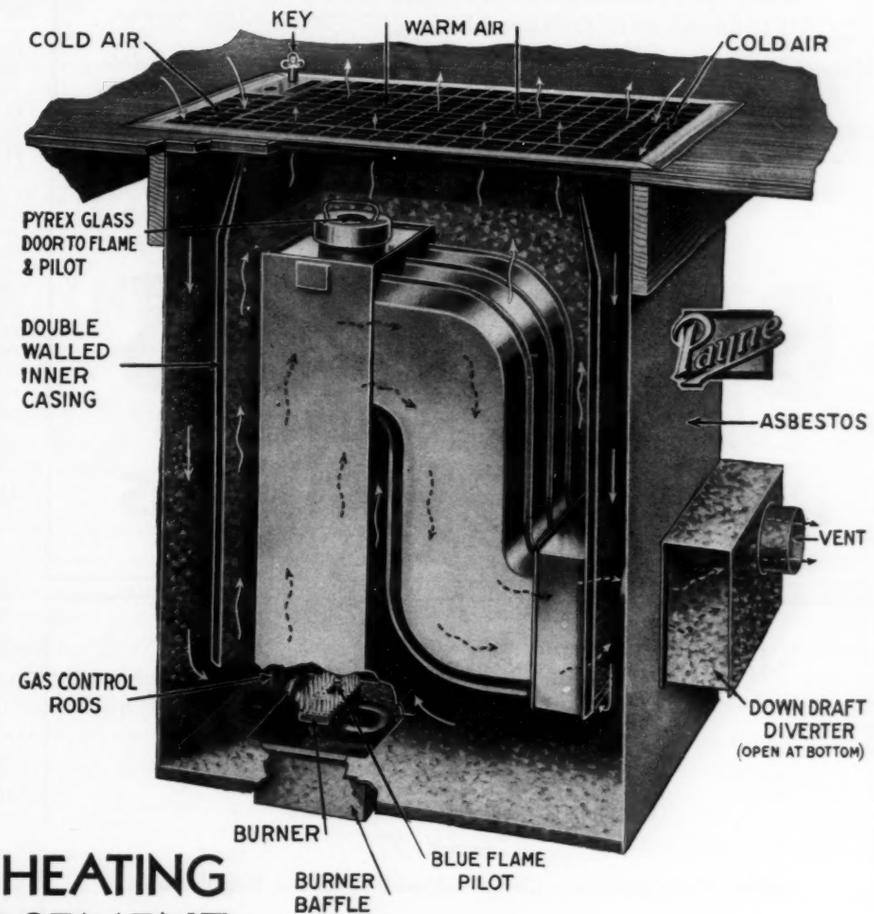
It is not possible at this time to say what the cost of such an installation would be if made on a quantity basis. However, further developments have already brought the cost of the equipment low enough to be within the means of many users of gas for house-heating purposes. The cost of operating has run about $.215 per hour. This is divided into $.092 for the gas burned, $.092 for electric power and $.031 for water. It is thought that the cost can be cut about 20 per cent and it is estimated that in a climate such as this (New England) that usage will be about 800 hours per year. This would mean for an 8-room exposed house about $150, of which about $75 would be for gas. It is expected that as the re-evaporation method of cooling is developed and used, instead of direct water cooling, that the percentage of gas revenue will increase and will reach about $90, which is greater than the entire year's revenue from the average house (excluding house heating).

Needless to say, a variety of problems arose, as can be expected when any new process is being perfected. For example, when the air is cooled too much, there is a tendency for the cool air to stay close to the floors; the equipment used on these installations is rather bulky for a home; the cost of the first equipment is, of course, out of line. These problems, however, are being aggressively met and solved. The families reported throughout the summer comfortable conditions in warm weather.

It is also quite probable that the benefits of this type of installation will mean more than bodily comfort in warm weather. For example, there already is some evidence to show that hay fever and similar sufferers are considerably (if not entirely) relieved when breathing the conditioned air.

(Concluding his discussion, Mr. Milener listed the steps in research and experiment which have advanced summer air-conditioning by gas to its present place. Improvement and simplification of residential equipment is proceeding on the basis of the valuable experience gained thus far. Ultimate incorporation of these units with gas furnaces will place the furnace manufacturer in a position to sell complete year 'round gas units.—*Editor.*)

PAYNE
FLOOR FURNACES



Winter's Substitute for Summer's HEAT!

THE PAYNE FLOOR Furnace uses gas—the cleanest, most dependable and most efficient of all fuels. Gives ideal summer heat indoors. Endorsed by thousands of users everywhere!

NO MORE COLD FLOORS • • No Sweating of Windows

THE PAYNE Floor Furnace circulates fresh pure warm air in every nook and corner, keeps floors warm! Free from smoke, fumes and vapors!

WARM AIR HEATING Without a BASEMENT

PAYNE FLOOR FURNACES have been tested and proved in the crucible of time. Durably constructed. Easy to install and operate. Completely welded heating element. Heating efficiency, burner operation, safety, construction and performance have been approved by the American Gas Association—and by thousands of happy and enthusiastic users.

Every PAYNE FLOOR FURNACE installation is a friend-maker and a sure "repeater". No forced selling to put this item over. A sales success for sixteen years.

Write Today for Details of Dealer Franchise!

Payne

PAYNE FURNACE & SUPPLY CO. Beverly Hills, California

THERE IS A PAYNE HEAT SYSTEM FOR EVERY BUILDING AND CLIMATE!

The BARTLETT HAYWARD CO.
Designers and Builders
GAS HOLDERS
COMPLETE COAL GAS, CARBURETTED WATER
AND BY-PRODUCT PLANTS
SALT WATER and FRESH WATER CONDENSERS
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BURNERS
FOR ALL REQUIREMENTS
NEMEC *combustion* ENGINEERS
WHITTIER – CALIFORNIA.

Newman Gas Equipment Co.
Industrial and Commercial Burners
Upshot Burners for Ideal Boilers
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447 Sutter Street **San Francisco** **Ph. GA 7833**

The Goodman Stopper
The Reliable Shut-off for Street Mains
Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Squab-Sauer Kraut Dinner For Southern Counties Salesmen

Officers, executives and members of the company sales organizations, numbering 103, participated in the annual sales dinner of the Southern Counties Gas Co. held in Los Angeles on the evening of January 18. The closing year's results were reviewed in brief.

A feature of the dinner was the double menu of squab and sauer kraut and weiners, respectively arranged for winners and losers in an interdistrict merchandising contest extending over the past year.

Principal address of the evening was given by F. H. Bivens, vice-president in charge of public relations and sales, who gave an interesting review of Southern Counties history since the early days of its organization. Other speakers on the program were Messrs. O. R. C. Grow, W. G. Rich and H. M. Wilcox. Clyde H. Potter, commercial manager for the company, presided at the dinner and announced sales plans for the coming year.

During the evening's program an attractive silver cup, donated by F. H. Bivens for a merchandising trophy, was exhibited. The cup will be temporarily presented at the end of each three-month period to the district with the largest sales in proportion to their quota, and permanently awarded at the end of the year to the district with the greatest number of wins during the 12 months. Quotas have been given to the company's eight districts for the first quarter period and adjustments will be made for each succeeding quarter on the previous three months sales.

Utility Contesting Right of Commission to Fix Minimum Rates

An interesting rate case is scheduled to be heard before the United States Supreme Court in which a Montana gas utility is contesting the right of the public service commission to fix a minimum as well as a maximum rate which the utility may charge.

Great Northern Utilities Co. is resisting the Public Service Commission of Montana's order to raise its rate in a proceedings in which the commission fixed the minimum rate at the level of that charged by a competing company. The company claims that it is entitled to lower rates for the purpose of competition.

The lower court in Montana upheld a state statute empowering the commission to fix minimum rates, but held that the order of the commission was unreasonable and void since it prevented competition for patronage by a utility which sought lower rates for the purpose of self preservation on account of the joint occupancy with a rival utility of a field which could support only one of the companies.

New Holder Being Constructed for Pacific Gas and Electric

Construction is nearly completed on the 100,000 cubic foot high pressure bullet type holder being erected by the Pacific Gas and Electric Co., at Willows, Calif. The holder is 20 feet 6 inches in diameter by 106 feet over all length. Other improvements in the Willows property include rebuilding of the generator, a two shell oil gas machine.

Merco Nordstrom Valve Co. Opens Office in Cincinnati

New offices have been established in Cincinnati by Merco Nordstrom Valve Co. The Cincinnati office will be located in the Chamber of Commerce Building. The office of the company at Charleston, W. Va., is being closed.

LET *Automatically Controlled* Gas sell your **INDUSTRIAL** prospect

YOUR industrial prospect knows, or thinks he knows, the advantages of gas as a fuel for his heating processes. But does he realize how *automatic controls* amplify these advantages?

Unless you have clearly pointed out to him the accuracy, precision and economy possible with automatically controlled gas in industrial process work, you have but partly told your story. You have overlooked the major part of your selling argument.

Minneapolis-Honeywell automatically controlled gas insures the greatest possible efficiency in preventing spoilage due to incorrect temperatures and in economy through eliminating fuel waste. Automatic controls are your most effective allies. Let them sell your industrial prospect. Minneapolis-Honeywell Regulator Co., Executive offices, 401 East 28th Street, Minneapolis, Minn. Factories: Minneapolis, Minn., Elkhart and Wabash, Indiana.

California Branch: 557 Market St., San Francisco. Distributors: Arthur F. Erickson Co., 315 Selling Bldg., Portland, Ore.; Arthur F. Erickson Co., 816 Terminal Trades Bldg., Seattle, Wash.; English & Lauer, 1224 So. San Pedro St., Los Angeles, Cal.; Daly Co., 1635 Blake St., Denver, Colo.; Hawley-Richardson-Williams Co., 204 Dooley Bldg., Salt Lake City, Utah. Other branch offices or distributors in all principal cities.

THE PROTECT-O-GLOW

Simple and dependable, this new device guards against unburned gas by INSTANTLY *shutting off flow if flame or pilot fails by breaking electric current and closing valve.*

THE PROTECT-O-GLOW SYSTEM

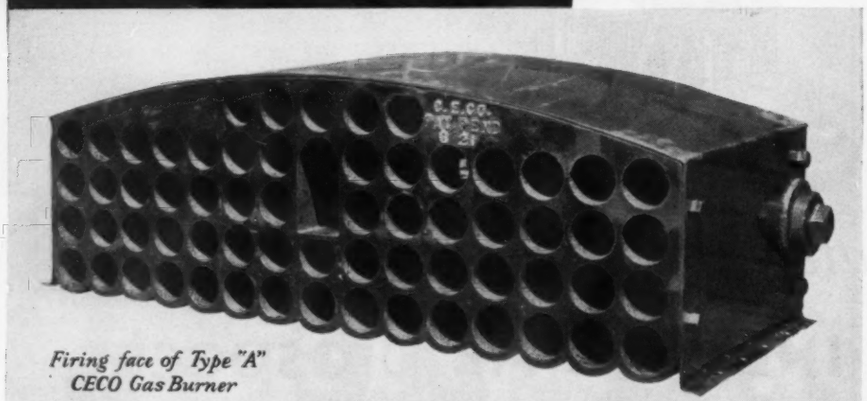
The New Minneapolis-Honeywell Protect-O-Glow *instantly* shuts off gas flow in case of flame or pilot failure, thus affording positive protection against the escape of unburned gas. Entirely electrical, and without moving parts, it is not dependent upon temperature and is absolutely reliable. The Protect-O-Glow is universal in application. The same instrument may be used for all installations, either independently or in conjunction with any desired type of control system.

Call the Minneapolis-Honeywell sales engineer today and let him explain the Protect-O-Glow and the many other control systems that will help you sell gas to your industrial prospects.

MINNEAPOLIS-HONEYWELL *and* **TIME-O-STAT**
Control Systems

MORE HEAT FOR LESS MONEY

A BULLETIN FULL OF MONEY-SAVING FACTS IS YOURS FOR THE ASKING



Firing face of Type "A" CECO Gas Burner

COMBUSTION EQUIPMENT COMPANY
KANSAS CITY, MO.
WICHITA MEMPHIS HOUSTON

CECO
POWER PLANT TYPE
(A & E SERIES)
MULTIPLE JET GAS BURNERS

BITGOOD
Multiple Jet Gas Burners
Industrial Furnaces
SAN JOAQUIN BURNERS
Prat Daniel Thermix Stacks and Air Heaters
Bigelow-Liptak Suspended Arches and Walls
North American Burners and Blowers
F. S. BITGOOD, Inc.
Furnace and Combustion Engineers
Los Angeles Portland San Francisco

Gentlemen:
Kindly send me a sample can and full details regarding A-B Vit
The New Porcelain Enamel Cleaner
Name.....
Company.....
Address.....
No obligation, of course
Clip and Mail with 10c to cover postage and packing to
A-B STOVE CO., Battle Creek, Mich.

Investigation of Lone Star's Rates in Oklahoma Near Close

Testimony in the case brought by the Oklahoma Corporation Commission to investigate gate rates of the Lone Star Gas Co. in Oklahoma was concluded January 12 and the Commission started at once taking testimony in a case involving distribution rates of the Community Natural Gas Co., affiliated with the Lone Star Gas Co. Harrison Smith, expert accountant of New York City, Ed C. Connor, consulting engineer of Dallas, and D. A. Huley, assistant to the president of the Lone Star Gas Co., were the chief witnesses for the Lone Star Gas Co. The commission used its own experts.

After receiving exhibits from the Community Natural Gas Co. on investments, expenses and return, the Commission recessed the hearing until February 1 to allow for the preparation of additional exhibits. The community Natural serves 26 cities in Oklahoma, and in each case the exhibits show that the percentage of return on the investment in these communities was far below what the courts consider to be reasonable.

Personnel Changes in the Oklahoma Natural Organization

Several changes in company personnel have been announced, as the New Year opens, by E. A. Olsen, president of the Oklahoma Natural Gas Corp.

J. A. Ray, who has been a Tulsa resident for many years, has been named district manager to succeed W. H. Bagley. Mr. Bagley, who is widely known in civic circles, joins Reid McBeth in the public relations department where his activities will cover a larger scope than heretofore.

Lurlene Even, who has been in charge of personal service to customers in the Tulsa office, has been transferred to Oklahoma City where she will fill a similar position. Her place in Tulsa will be filled by Florence Rush, who will combine the new duties with her present tasks as home service director.

Bob Fitzwater has been named head of the captal investment department, succeeding C. L. Hester, who has resigned to become an official of another company.

Power Corp of Canada Still Working on Regina Project

The proposal of the Power Corp. of Canada to supply Regina, Sask., with natural gas has not been abandoned, according to recent report. The company maintains headquarters at Montreal, and while franchise applications have been temporarily withdrawn, it is reported that plans are being made for the construction of a 175-mile line from the Bowdoin structure in northern Montana to Regina and possibly other cities and towns in Saskatchewan. Cost of the development is estimated at $10,000,000.

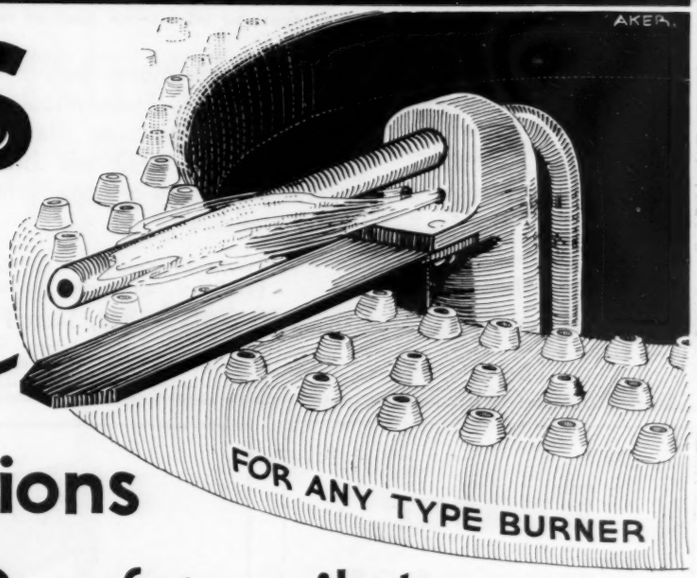
To Spend $30,000 on Additions to Springfield, Mo., System

New gas mains to cost about $30,000 will be laid in Springfield, Mo., during the winter months, according to a statement credited to E. S. Willever, assistant to the vice-president of the Springfield Gas and Electric Co., serving the city.

Distribution System at Logansport Scheduled for Completion March 1

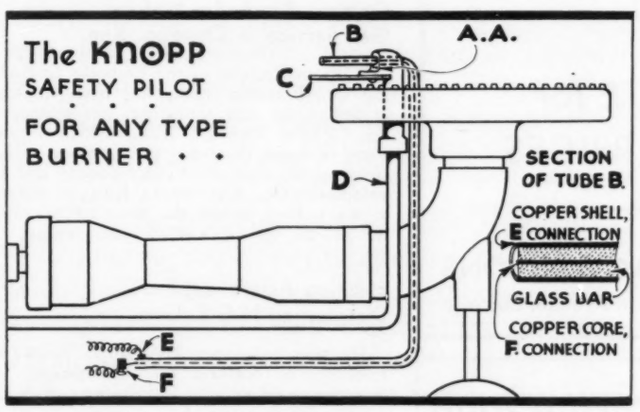
O. B. Siler, Dallas, Texas, has been given a franchise to serve natural gas in Logansport, La., supply to come from the wells of E. L. Chapman in Haslam, Texas. Completion of the distribution system is expected in by March 1.

GLASS to protect your *Gas* installations



The KNOPP safety pilot

Based on a new principle never before employed in safety pilot design. . . . . Time-tested under every conceivable operating condition and pronounced perfect . . . . Works with any type of electrically operated valve. . . . . Has no moving parts. . . . . No contact points to arc and freeze. . . . . No expanding rod to anneal or distort. . . . . Fool-proof, shatter-proof. . . . . Indestructible. . . . . Low in price, easy to install. . . . . Can be bent to suit every furnace. . . . . Utterly simple in design and operation. . . . . Used with the Knopp thermo-electric gas valve, or any other type valve that you prefer. . . . . The final solution of pilot light trouble.



Patent Pending

Operation: **Gas pilot flame burning in a horizontal direction from the two ports "AA" impinges on the metal tube "B", encasing a glass bar with a copper core. (The small Baffle "C" deflects the main burner flames away from the tube "B".) "D" is the by pass line from the gas valve. "E" and "F" are the two terminals through which the current flows to operate the gas valve. "E" is the terminal of the outside shell of the tube "B", and "F" the terminal of the copper core which is encased in the glass bar of tube "B". When the flames from "AA" impinge on the tip of the tube "B" the glass becomes a conductor of electricity, completing the circuit between the inner core, or "F" connection and the outer core, or "E" connection. If the pilot flame is interrupted for any reason, the glass bar cools slightly, thus becoming a non-conductor and breaking the circuit.**

Write for sample . . . shipped on memo invoice. To appreciate the merit of the Knopp Safety Pilot, you must try it on your own equipment. Give it any conceivable test for safety and durability. If you are not satisfied with the Pilot, send it back.

GAS & ELECTRIC FACILITIES LTD.

447 Sutter St. San Francisco

Electrogas Floor Furnaces—5 A.G.A. approved models—to meet all requirements

Electrogas
FLOOR
FURNACE
"It's Matchless"

NOW—more than ever before, Quick, Economical Heat is in demand wherever Natural Gas is available. 1932 will be profitable for those who are ready to meet this demand.

[Write us—right now—for details of our new cooperative selling plan.]

Electrogas Furnace Co., 466 Sutter St., San Francisco

Proven economy and efficiency through ten years of service.

Fraser Furnaces

Floor Furnaces
Wall Furnaces
Console Heaters

A complete line of Quality Equipment

20 different models all A.G.A. approved

Write for prices and additional information

Manufactured by

Fraser Furnace Company

Stockton, Calif.

Distributed by

H. R. BASFORD CO. San Francisco Los Angeles

SUBSTANTIAL REDUCTION ON VENTED CLOW GASTEAM RADIATORS

WRITE for NEW PRICES

JAMES B. CLOW & SONS
201-299 N. Talman Avenue, Chicago

The Semet-Solvay Engineering Corporation invites your inquiries for

Equipment for the manufacture, cleaning and handling of gas.
Equipment for the recovery and treatment of coal by-products.
Welded steel products, piping and valves.
Producer gas and blue gas apparatus.
Engineering service, investigations and reports.

Semet-Solvay Engineering Corporation

40 Rector St. New York, N. Y.

Western Service Corp. Reported in Receivership

Logan W. Cary, president of the Consolidated Gas Service Co., Oklahoma City, has been named receiver for the Western Service Corp. headquartered in Oklahoma City. Mr. Cary will replace receivers appointed by state district courts of Logan and Pottawattomie counties.

The Oklahoma Natural Gas Corp. is still serving gas customers at Shawnee, Okla., although a franchise was granted last summer to the Western Service Corp. No transfer of the properties to the Western Service Co., which succeeded the Western Service Corp., has yet been made.

Gas Imported to Canada Is Subject to Duty Payment

A report circulated recently, stated that the government of Canada had prohibited the importation of natural gas into Canada from the United States. According to word received from government officials there is no law to that effect in existence. Natural gas is duitable at the rate of 6 cents per 1,000 cubic feet, plus the sales tax and gas manufactured from coal, or oil for illuminating purposes is admitted into Canada without the sales tax.

Utilities Power and Light Corp. Earnings Steady

With an increase in gross earnings from its British properties and a decrease of only nine-tenths of one per cent in the gross of its American utility properties for the 12 months ended September 30, 1931, Utilities Power & Light Corp., Chicago, Ill., shows earnings to have been maintained on practically an even basis with the corresponding previous 12 months.

Getting Ready for Natural Gas Service in Oswego, Kan.

William Ruggles of the Emporia Engineering Co., Emporia, Kan., has been employed to design the new municipal gas system for the City of Oswego, Kan., which recently voted a bond issue for the purpose of constructing the system. Veeder Supply and Development Co., Cherryvale, Kan., is reported to have been given the contract to supply the gas for the city's distribution mains.

Heating Assurance, Inc. Distributing N.G.E. Line

Heating Assurance, Inc., Butte, Mont., distributors of Natural Gas Equipment, Inc., has completed several installations of N.G.E. equipment throughout the state, one of the most recent being that of the French Bakery in Butte. Results at this installation have shown substantial savings in fuel costs as well as saving in time required to bring ovens to baking temperature, since introduction of natural gas.

Ragsdale Appointed Secretary to J. B. Wilson at Santa Cruz

R. Ragsdale, who has been associated for the past two years with Pacific Public Service Co. and Standard Management and Operating Corp. in San Francisco, has been transferred to the Coast Counties Gas and Electric Co., Santa Cruz, in the capacity of secretary to J. B. Wilson, president.

$800,000 Worth of Automatic Gas Water Heater Business

to be developed within 4 months

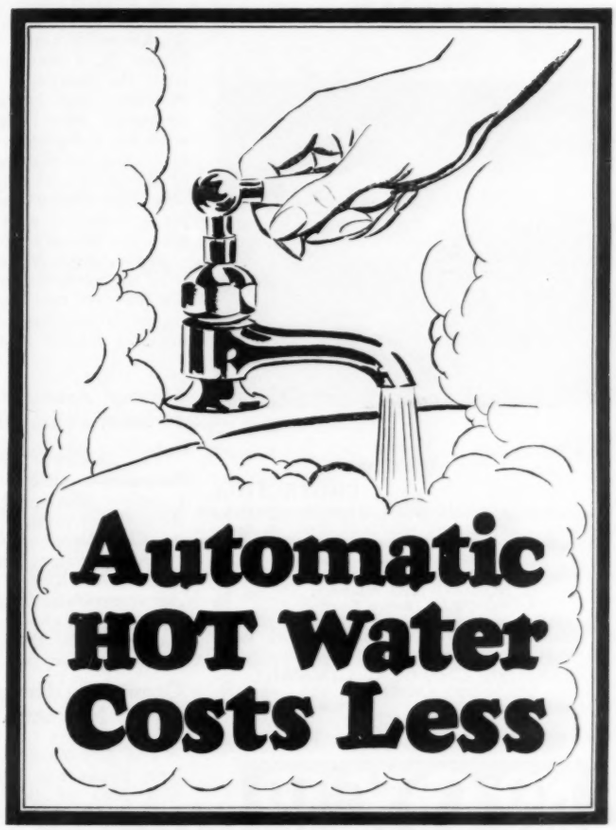
...plan NOW to get YOUR share!

The water heater business needs stimulating. Leading water heater manufacturers are to start the ball rolling by offering, through their dealers, the easiest terms ever made available to the buying public.

This offer is the keynote of a United Industry Campaign to sell 8,000 Automatic Gas Water Heaters during February, March, April, and May, 1932. This number of sales will result in $800,000 worth of business for the water heater industry.

Since the campaign is open to all, it will be up to each individual to obtain his share of this business. Manufacturers, distributers, and dealers throughout Northern and Central California are tying in their advertising and sales plans with those of the United Industry Campaign.

Pacific Gas and Electric Company is to support this unprecedented campaign with the largest volume of advertising it has ever devoted to Automatic Gas Water Heaters. This advertising will feature the economy and advantages of Automatic Gas Water Heaters and the lowest prices and easiest terms in history. Prospects are to be invited, as usual, to visit their dealers' stores as well as P. G. and E.



This design heralding the slogan, "Automatic HOT Water Costs Less," is to be used in all Campaign Advertising. At your request, Pacific Gas and Electric Company will gladly furnish you with mats of this design, one, two, or three inches wide, so that you may use it in your tie-in advertising. Place your requests, early, with our Publicity Department, 245 Market Street, San Francisco, California. Be sure to state the size you desire.

Make your plans now, as others are doing, to tie in with this $800,000 sales drive, Reap your share of the profits.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned·Operated·Managed
by Californians

WG-202-232

Lone Star Sponsors Vocational Course

THE first vocational course on flue gas and combustion control has been started in Fort Worth, Texas, high schools with Frank Jackson, industrial engineer of the Lone Star Gas Co., Fort Worth division, as instructor. The course was inaugurated by G. B. Trimble, director of Fort Worth vocational schools, who requested gas company engineers and experts to prepare the work. Details were planned by Mr. Jackson, E. C. Whitcomb, new business manager, Fort Worth division, Lone Star Gas Co., and Wade Page, distribution superintendent, Fort Worth division.

Mr. Page, Mr. Jackson and Mr. Whitcomb, at the request of Mr. Trimble, arranged for the course in "Flue Gas Analysis and Combustion Control" to be sponsored and put on through the high school vocational department. Details were worked out by these three men with Mr. Trimble, and the course prepared by Messrs. Jackson and Whitcomb with Mr. Jackson chosen as instructor, the course being developed at the request of school officials. Mr. Jackson is due large credit for assembly of data and its arrangement for presentation with approval of the school.

J. H. Fisher Returns to Head Fisher Governor Co.

At a special meeting of the board of directors of Fisher Governor Co., December 18, at the main office at Marshalltown, Iowa, Jasper H. Fisher, who has been associated with the company since 1912, was elected president and is now active head of the company. Mr. Fisher has, in his 19 years with the company, served as secretary, president, and for the past two years as chairman of the board of directors. He has, for the past few years, resided in California, but plans to return with his family to Marshalltown in the near future.

L. W. Browne, who has been connected with the company for the past 16 years and for the past two years as president, has resigned as president and member of the board but still retains a stock interest.

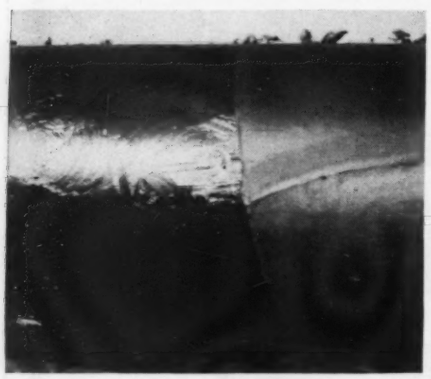
Missouri Association of Public Utilities To Meet at Excelsior Springs, Apr. 28-30

The Executive Committee of the Missouri Association of Public Utilities has selected Excelsior Springs, Mo., as the place for the Annual Convention. Sessions will be held in the Elms Hotel on April 28, 29 and 30.

The program committee, of which H. E. Scheark of Kansas City, is chairman, and the entertainment committee, Paul C. Ford, Kansas City, chairman, are now working out the details for the convention.

Community Natural Gas Co. Opens New Abilene Office

The Community Natural Gas Co. at Abilene, Texas, has established new offices on the first floor of the Masonic Building, 1257 Second street, after maintaining temporary headquarters at 1125 North Second street. A formal opening of the offices was held early in January. C. C. Redding is local manager for the gas company.



POSITIVE
NON-DRYING
PROTECTION

The illustration shows a pipe coated with NO-OX-ID and partly wrapped with NO-OX-ID-IZED Wrapper. The complete NO-OX-ID Master Coat consists of:

1. Dearborn Pipe Mill Coat.
2. NO-OX-ID "G" Special.
3. NO-OX-ID-IZED Wrapper.
4. NO-OX-ID Service Coat.

This coating embraces the qualities that research and experience in pipe line protection have found most valuable. Inquiries invited.

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NO-OX-ID
IRON-RUST
The Original Rust Preventive

METTLER AUTOMATIC SAFETY PILOT

PILOT LIGHT
CHANGEABLE ORIFICE ANY KIND OF GAS
AUXILIARY PILOT AND ELEMENT HEATER
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OUTER SAFETY COVER
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SITUATIONS WANTED—MALE

Mechanical and electrical engineer, age 46, with ability to speak Spanish, seeks position. Applicant is experienced in work with butane gas, having installed and put into operation 15 butane plants on Pacific Coast, and has had 20 years experience in supervising construction and as local manager of gas and electric company. Address Box E-169, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Manager of gas company with 10 years experience desires to make connection with larger utility where ability to produce will win advancement. Location immaterial. Detailed experience and references furnished. Address Box E-165, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Married man, 19 years experience in construction, operation and maintenance of high-pressure natural gas mains, desires position. Applicant will go anywhere, and will do any kind of work, but prefers maintenance of high pressure line. Can supply good references. Address Box E-167, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Accountant and auditor, several years practical diversified experience, including service with gas companies, desires position. Applicant is competent to take charge and can prepare financial and other supporting statements, including tax matters. Location immaterial, will work for moderate salary. Can supply references. Address Box E-163, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Salesmanager, now employed, wishes to make change. Six years experience with natural gas. Understands gas appliance merchandising, installations, conversion jobs, etc. Applicant is 30 years of age and married. Can furnish references. Prefer to locate in northwest states. Address Box E-171, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Construction and field engineer desires position, location immaterial. Applicant has had seven years experience on pipe line construction, layouts, mapping, surveying, and as building superintendent, and also two years experience on butane systems. References furnished. Address Box E-177, *West-*

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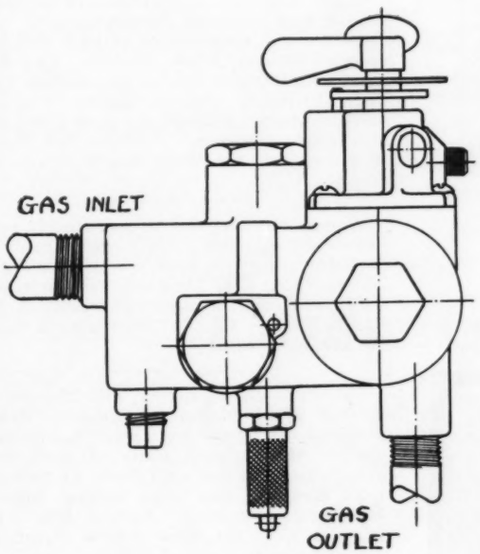
The Welsbach Multiduty Control



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8. A rugged, large capacity Graduating type Thermostat.
9. A fusible plug Temperature Relief, for heaters connected with sources of heat other than gas.
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The Welsbach Multiduty Control Merits Your Special Consideration

The combination of the Welsbach Multiduty Control and Welsbach Automatic Burner constitutes complete control and safety equipment to make water heater installations 100% safe.

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Welsbach COMPANY
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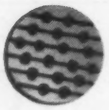

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That Never Saw a Volcano

LAVA is resistant to temperatures of more than 2000° F. without distortion or weakening. Its dimensions are practically constant under wide variations in temperature, having practically no coefficient of expansion.

And LAVA is mechanically strong, with high compressive strength. It is heat-treated to diamond hardness after we have completed its machining.

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HAS YOUR ENGINEER GAS BOOK 31?

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ern Gas, 124 West Fourth Street, Los Angeles, Calif.

Executive, experienced in all phases of public utility operation and management, especially electric and natural gas, desires position. Applicant is capable of assuming responsibility for operation of a property, and has been particularly successful with public relations and merchandising. Will locate anywhere. Available immediately. Unquestionable references furnished. Address Box E-179, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Executive type of man, now employed, with large personal acquaintance with leading utilities and dealers of the West, desires to make change. Experience includes conducting of sales classes, cooking schools and merchandise sales. Can furnish highest type business, personal and financial references. Address Box E-185, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Single man, age 27, experienced in house heating and industrial conversion work, also operation and maintenance of high and low pressure systems, wants position. Past four years with the Gas Service Co., Kansas City, Mo. Desires to make connection with another company; will go any place; can furnish good references. Address Box E-187, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Woman secretary desires position. 12 years experience in public utility commercial department and gas appliance wholesale organization. Complete knowledge of secretarial duties and office management. Address Box E-183, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Heating engineer, age 38, with 23 years experience in the natural gas industry, desires position with active company. Applicant is capable of managing series of small town properties. Has had experience as manager, sales manager, and chief heating engineer with large companies. Address Box E-181, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Mechanical engineer and draftsman experienced in laying out, drawing plans, and writing construction specifications for gas compressor stations and natural gas absorption plants, also in supervision of construction, desires position with company needing qualified man. Applicant's age, 29 years. References and record of experience supplied. Employment duration and location immaterial. Address Box E-173, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Natural gas engineer, 34 years of age, married, seeks position. Applicant has had 12 years experience in new business, public relations, furnace conversions, valuation and main line and distribution system construction. With the exception of 2 years this experience has been in the Mid-Continent field in new gas territory. Address E-Box 175, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Texas Public Utilities Will Build Line to Power Plant

Texas Public Utilities Co., Eastland, Texas, planned to begin construction in January on a line from the Strawn field to supply the electric power generating plant of the Texas Electric Service Co. near Ranger, Texas.

Decorative Cover

Liberally ventilated to insure free circulation of air at actual room temperature. Attractive lines. Easy to keep clean.

Heavy Valve Casing

Accurately machined. High pressure type valve rod. Serves as base for assembly of complete Wilcostat. Incorporated by-pass adjustment and pilot light-outlet.

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Complete assembly unit of balanced construction. Protected against abuse or straining due to over-expansion. Large movement per degree of temperature change. Responds instantly to change in temperature.

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Easily removed for cleaning, if necessary. Large capacity with extremely low pressure drop.

To the GAS COMPANY Not Selling Enough Space Heaters—

THE merchandise manager whose sales of space heaters need stimulating may have overlooked this important fact—

Nowadays people demand more than just *heat* from a heater. They require *ease* and *certainty* of operation.

They get it in Wilcostat Automatic Room Temperature Control. It unfailingly keeps the temperature within a degree of the setting. Is adjusted by an easy turn of the wrist. Is attractive, but ruggedly constructed.

Play up the Wilcostat in your showrooms. You'll sell more heaters when folks realize how convenient they are with a Wilcostat to guide them.

This isn't just talk. One aggressive gas company has just sold nearly 500 Wilcostats in a few weeks. Many other companies are actively using the Wilcostat to promote new heater sales, and for modernizing older installations.

At a nice profit, too. Write for prices and literature.

THE WILCOLATOR COMPANY, Newark, N. J.

Specialists in Temperature Control for Household Appliances

Back up your Spring Home Heating Drive with the COMPLETE ROBERT'S LINE

Now is the time for aggressive selling effort to build the home heating load. During these next few months of unsettled Spring weather, thousands of home owners will use makeshift heating apparatus when the sun goes down, rather than keep the fires going twenty-four hours each day.

Go after the hundreds of good gas burner prospects in this group. Spread the story of gas for home heating and the advantages of the Roberts Controlled Gas Heating Unit.

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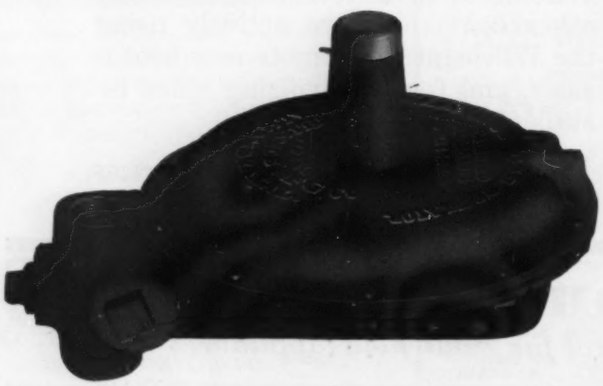

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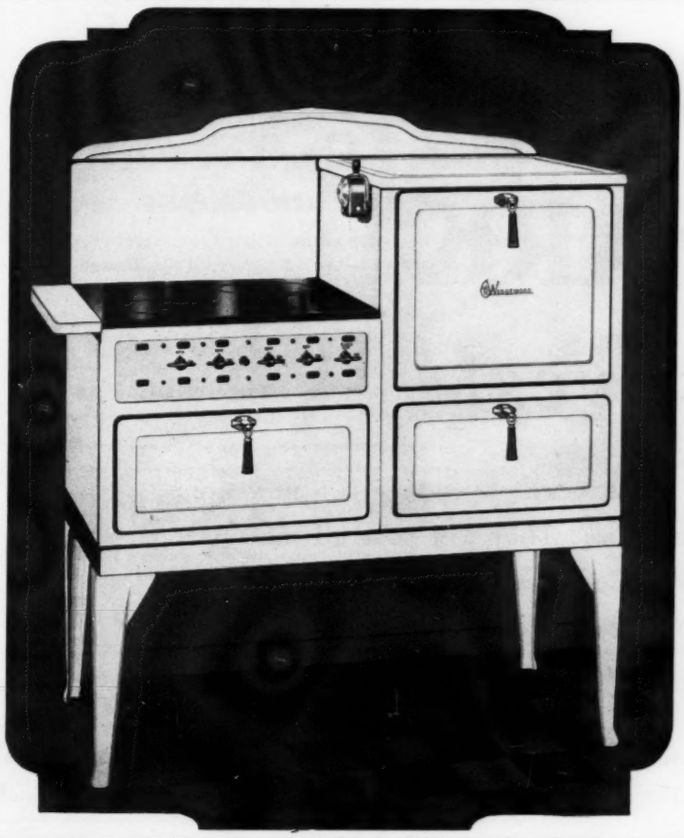

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"Console" CLOSED TOP

May also be had with Kitchen Heater.

Choice of three charming finishes—cool green and ivory, mellow ivory and marble. Matchless beauty—Smooth stream lines and no corners. Large Roll-out Broiler permits broiling with door open. Stainless, rust-proof enameled cooking top. Porcelain oven linings. Truly this advanced gas range is an outstanding value—a super value.

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Wedgewood's greatest achievement!

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Largest Stove Manufacturers in the West
A Pioneer That Is Still the Leader
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Sprague Semi-Chrome Leather

Resists Acids and Boiling Water

Now Used in All

Sprague Meters and Regulators

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The Sprague Meter Co.

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Watch

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Stoves!

Within the next few weeks SPARK will introduce two new numbers of its famous "Senorita" line. They will have all the smart, modern beauty of the Senorita Consoles, with many patented and exclusive Spark features. But—*the price will surprise you!* Be prepared to cash-in on the quickest-selling stove you've ever handled.

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Modernizes the Kitchen Range

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without a minute's time lost!

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The Cleveland Baby Digger illustrated above on a West Coast gas line job dug 50,000 lineal feet of ditch without any delays or stops. There was absolutely no time lost. The operator in speaking of its performance said: "Tell 'em, for me, it's the sweetest little baby I ever handled, and I have run them all."

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Compact, mobile, powerful, sturdy and fast—quality built throughout—and designed exactly to meet the severest requirements for digging gas trench, the Cleveland Baby Digger has earned an enviable reputation for dependable, trouble-free performance.

Visualize what this day-in-day-out sureness of performance means in increased trench dug and pipe laid—how it saves labor time consistently opening more trench in more places, keeping the pipe laying crews constantly busy.

If you would learn what real machine trenching performance can be, use the Baby Digger on your next job—it is fitted to your work. Write for specifications.

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"Pioneers of the Small Trencher"
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For Sale by
EDWARD R. BACON COMPANY
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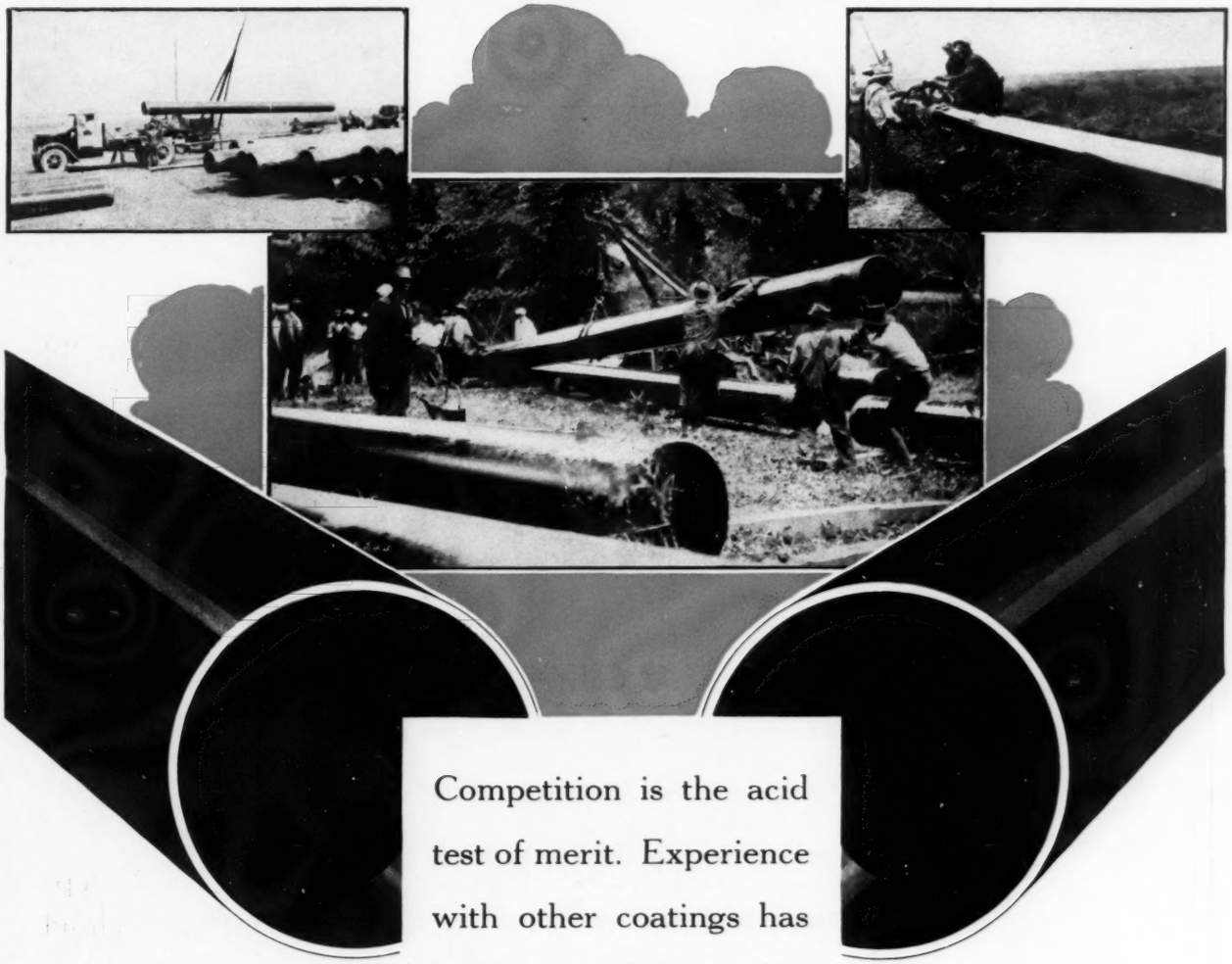

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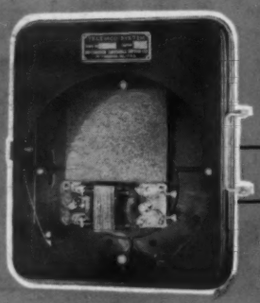

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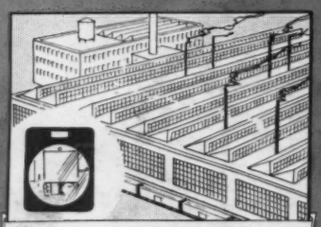

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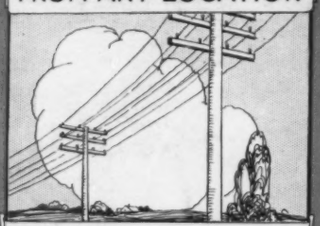

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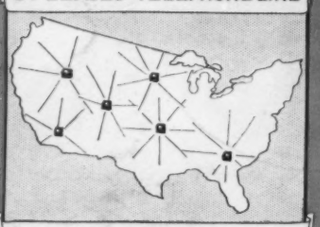

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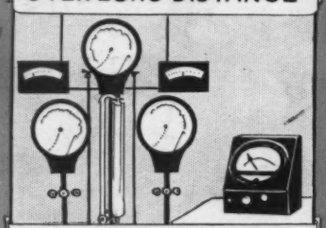

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